

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

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Automotive Industries



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Automotive Industries

"Help!" Cry Engineers to Tool Builders— "But Make It Good!"

by
Athel
F.
Denham

Aid on production possibilities needed in early stages while design is still liquid. Majority welcome technical assistance but not selling pressure

BEHIND the scenes in automotive factories there has been a duplication of what has been going on in other industries. Capital expenditure for necessary new equipment in many cases has been blindly restricted. Engineering departments have been cut to the bone and appropriations for developmental work chiseled to a minimum.

But already there has been announced one of the new lines of cars which are to make their bows to the public before the year is out. Others are certain to follow, and their advent will make it essential for other manufacturers once more to expand appropriations for engineering work and production facilities or be content to take a back seat. These cars aren't new models—they are distinctly and distinctively new cars—designed to and for the economic conditions of today. They are conventional only as the general conception of an automobile is conventional. In detail they include a multitude of departures from the standardized empirical design of today.

They will require not only new designs of major units but also need production equipment to make those designs possible.

And a vast majority of the leading vehicle and parts engineers admit frankly that they need the help of the machine tool manufacturer *while the design is still liquid*, so that they may not be hampered by lack of knowledge of detailed production possibilities. They don't want to throw away new ideas because equipment

is not available to produce them economically if that can be avoided. But they say they don't want to send out a call for the average machine tool sales representative. Acquaintanceship with machine tool "salesmen" in the past, they state, makes them hesitant to seek this avenue of escape and help on the tougher production design problems.

Here is what the assistant chief engineer of one of the manufacturers of higher-priced cars has to say—and his company is noted for the progressiveness it has shown in the past in the way of production facilities to meet new design problems:

Exaggeration Has Cost Confidence

"The biggest obstacle to the cooperation needed in your plan is the salesman himself. Most of them are such exaggerators that you just naturally don't take any stock in what they say. That is why there is no tendency to take them into your confidence on new ideas."

He feels more strongly on this question than any of the others who have commented on this story. The executive head of the experimental development division of another producer of automobiles, however, doesn't give the machine tool salesman (old style) a very much better letter of credit. He says:

"Personally, I certainly give the air to a 'salesman' in short order, but welcome the opportunity of talking

with someone who can definitely contribute information or advice of worth-while character."

Another chief engineer, who, it is reported, is slated soon to be put in charge of manufacturing as well—and who has previously worked on the machine tool side of the fence—also feels that the old-style machine tool salesman has outlived his usefulness.

Yet these men do want suggestions from machine tool men. The chief engineer above mentioned says in his letter:

"A closer contact between the manufacturer of the machine tool and the user of it in the *preliminary stages* of that consideration is an absolute essential for modern competitive times." He goes on to cite several examples of machine tool manufacturers here and abroad whose policies have approached the suggested plan, and whose success has largely been based, as he says, "not entirely on the quality of their standard designs but also on their ability to amend, or correct, or ally those designs with the specific problem of the user."

The head of the experimental development division referred to has this to add when it comes to the influence the machine tool manufacturer might have on engineering design:

"One man never built an automobile single-handed and many very interesting developments, which have been brought to a point where their performance is known, are held up or thrown in the discard through lack of time or thought on methods of production."

He goes on to cite confidentially several examples of effective engineering designs which his company would like to use today but can't because the machine tool manufacturer hasn't become acquainted with the

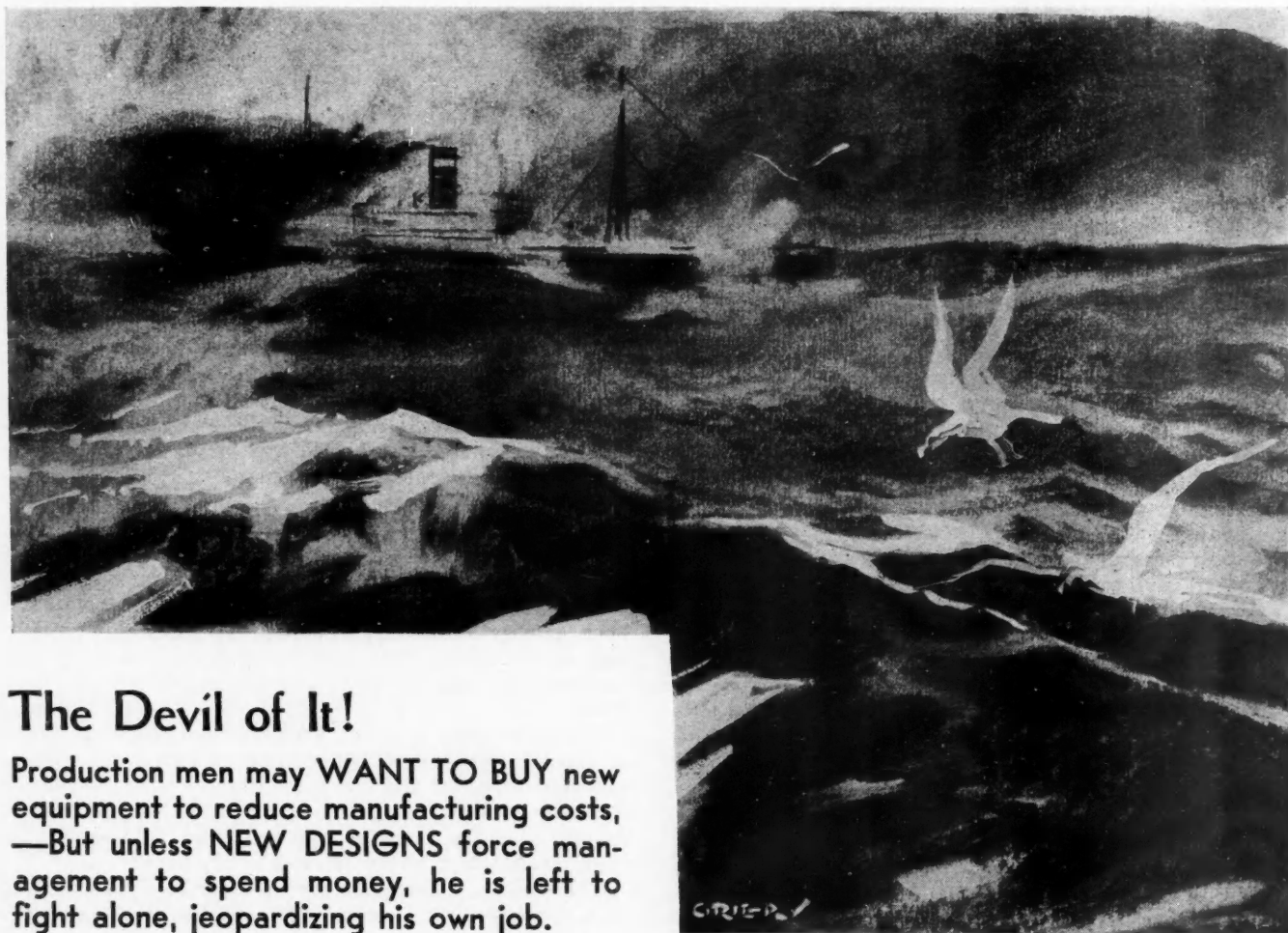
problems and therefore hasn't been able to give them the necessary thought. He adds:

Single Contact Insufficient

"Personally, I feel that in some instances where a new device is under consideration or is being brought in for consideration, contact with management is desirable. Contact with one division is not enough. Production and inspection have one slant but in general are abysmally ignorant concerning the significance of some qualities as affecting performance. This has been demonstrated time and again. The point that I am making is that tool designers cannot get the whole story from any one source, and in general should start with the engineering department."

More evidence of willingness and desire to cooperate come from the engineer in charge of engine design and development of one of the two largest manufacturers of passenger cars in the country:

"I have felt for quite some time that foundry, forge, as well as parts sources, should be guided by some well accepted automotive talent to interlock their thinking with that of the car manufacturer. You have added the tool man, and why not? After all he is the best mechanic of the lot. He knows quality and knows from experience the obstacles to economic handling. The tool man may easily turn his experience to the solution of many of the present problems if he can be on the ground while designs are liquid. It may even be that from these contacts the tool man may find himself developing product designs that can be made to mutual advantage of engineer and machine tool maker."



The Devil of It!

Production men may **WANT TO BUY** new equipment to reduce manufacturing costs, —But unless **NEW DESIGNS** force management to spend money, he is left to fight alone, jeopardizing his own job.

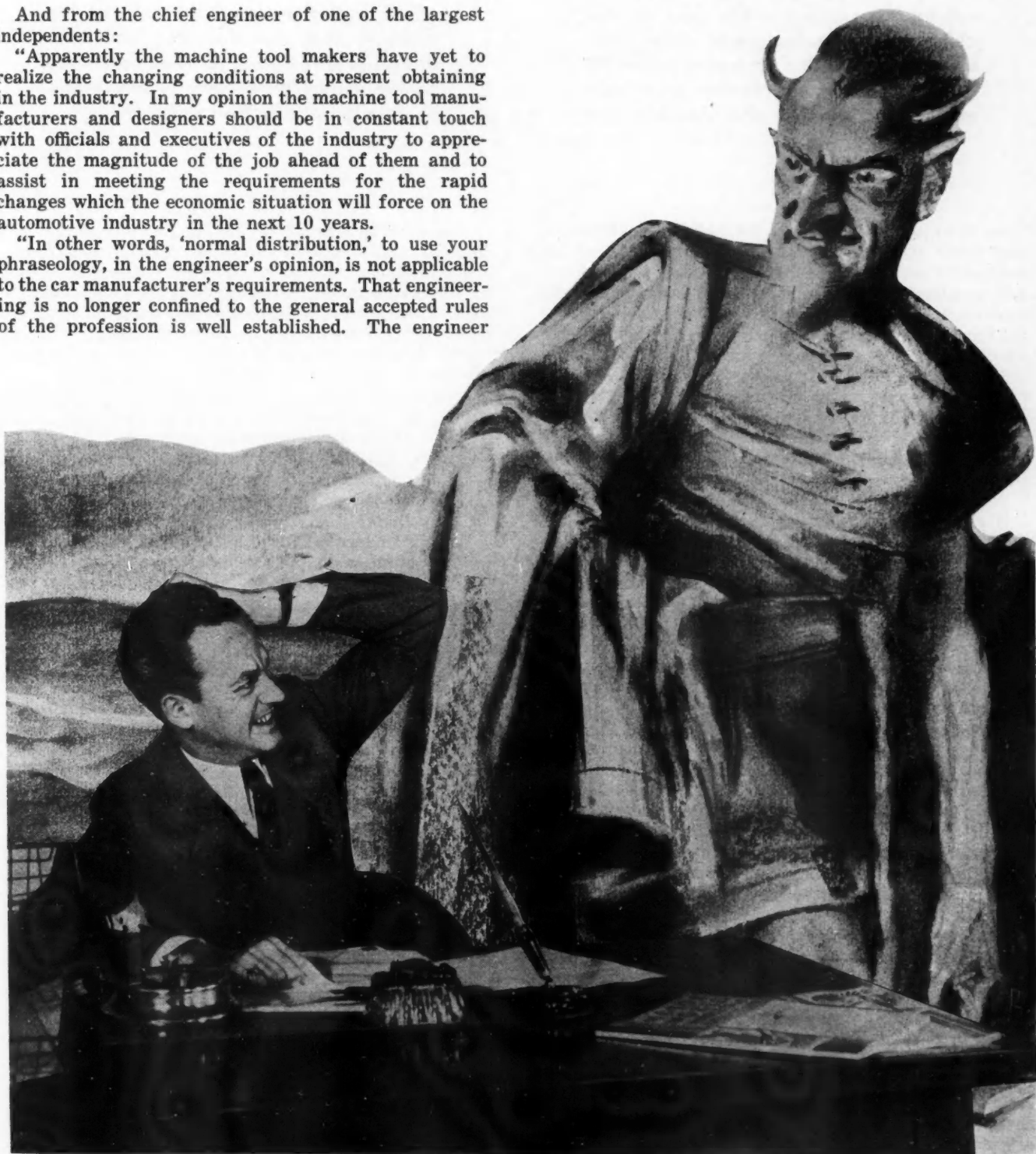
"The production man has been placed between the devil and the deep and very blue sea. He would like to buy equipment to build cheaper what he already is producing.

"But he can't afford to commit himself for new machinery which he may have to scrap or change extensively at an early date if present parts designs are pretty well altered—as they may be."

And from the chief engineer of one of the largest independents:

"Apparently the machine tool makers have yet to realize the changing conditions at present obtaining in the industry. In my opinion the machine tool manufacturers and designers should be in constant touch with officials and executives of the industry to appreciate the magnitude of the job ahead of them and to assist in meeting the requirements for the rapid changes which the economic situation will force on the automotive industry in the next 10 years.

"In other words, 'normal distribution,' to use your phraseology, in the engineer's opinion, is not applicable to the car manufacturer's requirements. That engineering is no longer confined to the general accepted rules of the profession is well established. The engineer



In the March 12th issue of *AUTOMOTIVE INDUSTRIES* there appeared an article entitled "Machine Tool Makers Can Jump in as Consultants to the Industry."

Since that time the writer has received dozens of letters from tool manufacturers, from chief engineers of automobile companies, from engineers in charge of development work, and from other automotive executives.

The plan suggested in this article involved the placing in the field by machine tool manufacturers, either individually or jointly, of ambassadors to the engineering fraternity; men with engineering training who would be the

connecting link between Design in its more elementary stages and the Production Equipment required to produce that new design.

One or two machine tool producers have done that very thing in a modified way and have found interesting leads to new business already. The majority admit the desirability of such a move but some of these question the workability of such a plan.

Engineers, on the other hand, frankly admit that they need the help of the machine tool manufacturer while the design is *still liquid*, so that they may not be hampered by lack of knowledge of detailed production possibilities.

must have at his finger tips the various fundamentals that enter into the ultimate sale and service of his product. Cost is a prime factor in *design*. Cooperation and coordination between the vehicle engineer and the machine tool manufacturer will probably bring about the happy state of affairs which you expressed in your article."

Such evidence as this and corroborative opinions from other letters which could be cited were it not for space limitations do seem to prove rather conclusively that the door is open to the machine tool manufacturer who may present the necessary qualifications for admission.

Yet much general apathy continues.

Might some of this be due to a misconception of the fundamentals underlying the sale and purchase of production equipment today? The machine tool manufacturer's contact with the automotive producer of parts and vehicles in the past, except in special cases, has been under conditions and at a time when the conception of the design had already been completed. At the earliest he came into the picture when this conception was being translated into final production prints and routing sheets.

That condition was satisfactory as long as the economic picture didn't change. It certainly proved its efficiency in enabling the manufacturer to build cheaper and cheaper automobiles and the machine tool industry to grow to its present size. Everything was more or less cut and dried—design as well as possibilities for production economies. Sales didn't have the influence on engineering it has today, and production and engineering adapted themselves readily to each other.

That isn't true today. The production man has been placed between the devil and the deep and very blue sea. He would like to buy equipment to build cheaper what he is already producing. But he can't afford to commit himself for a lot of new machinery which he may have to scrap or subject to expensive changes at an early date if present designs are pretty well junked—as they may be. In this he is reflecting the attitude and rulings of administrative executives, boards of directors and even sales managers and engineers in some cases. He would often like to be sold but he needs assistance in obtaining the necessary appropriations.

Machine tool representatives can and should continue to point out to manufacturers the possibility of reducing production costs, but such effort should be guided by a more intimate knowledge of where such cost reduction will show a profit on the manufacturer's balance sheet for this year and the years to come.

This may be made a little clearer perhaps by considering the three basic types of machine tool sales:

1. Machines *bought* for replacement and new work:
 - a. "Standard" machine tools requiring no or little development or study.
 - b. "Special" tools to increase production by duplication or for replacement.
2. Machines sold specifically to reduce manufacturing costs:
 - a. Modern standard machine tools with fixtures and small tools designed specifically for the purpose intended.
 - b. Special tools adapted to the specific work required.
3. Machine *sold* to fit a definite new problem of manufacturing and design.

So far major concentration has been on the first type of sales—filling orders. This market seems almost to have disappeared, due to ruling on capital expenditures. The market possibilities of Nos. 2 and 3 today are greater than ever. A set-up which will enable the machine tool manufacturer to do the third type of selling would also be of tremendous value to him in the second type, guided as he would be by a better knowledge of the importance of the specific operation, sequence of operations or parts under consideration.

The transmission producer who today would start out and buy a lot of new equipment to produce designs rapidly nearing obsolescence would just be looking for financial trouble. Yet there are many new tools which he is going to need, and need soon to produce the new designs being demanded by the industry. He doesn't even know in many cases what he needs nor for that matter exactly what kind of a transmission each will be. And he won't know until the machine tool man gets into the picture. Those who get to the transmission designer first certainly should have the advantage. And the control of transmission production by engineering is only typical of the entire industry.

JUST AMONG OURSELVES

Motor Magnates Branching Out

THIS may be a bad year for business in the automotive field but it's a good year for recognition of automotive men. Roy Chapin is appointed Secretary of Commerce; Henry Ford becomes the author of a leading article in *Collier's*; Walter Chrysler furnishes copy for an elaborate story by the more or less famous Frazier Hunt in *Popular Mechanics*, and Charles F. Kettering has a book published.

There's probably more, but that's all we think of this afternoon.

Duesenberg Favored Race Rule Changes

OUR last conversation with Fred Duesenberg took place at the Duesenberg branch in Philadelphia just before he stepped into his car to start that last ill-fated ride toward Indianapolis. Our talk was of many things, and Fred's comments, as always, were as keen as they were kindly.

We talked of the proposal made by "Barney" Roos of Studebaker that the Indianapolis Race rules be changed to provide limit to the amount of gasoline and oil used and to increase the length of the race to 600 miles. Fred hadn't read the article yet—it had appeared in *Automotive Industries* of June 11—and carried a copy along with him, promising to write us some comments later.

He did say at once, however: "I think the idea of limiting oil and gasoline consumption is fine! I tried to get some such idea in-

corporated a number of years ago, but I didn't get anywhere. I hope they'll do it."

He was definitely opposed to increasing the length of the race, feeling that it was already plenty long enough.

Oil Limit—"Yes" Longer Race—"No"

NO official report has been made public of the meeting of the A.A.A. Technical Committee held in Detroit shortly after Fred's death at which "Pop" Meyers asked for and got a full discussion of Indianapolis Race rules. But if informal reports which have drifted in to us are correct, it would seem as though at least part of Fred's hope would come true.

Certain it is that the Detroit gathering was attended by more passenger car factory engineers than ever before and that real interest in the future rules was displayed. It's our guess that there is some chance of the limitation on oil consumption being put into effect.

It's our guess also that the length of the race never is going to be increased.

Mergers Maybe May Materialize, But—

MERGER rumors, it seems, are again spreading and again being denied. Same old names are mentioned in various alignments—Packard, Nash, Studebaker, Auburn, Willys-Overland and so forth.

One of our contemporaries seems to think that "obviously

enough present business conditions make mergers a possibility. . . ." As a matter of fact, it is just present business conditions which seem to us to make mergers an improbability.

The records show that a goodly crop of mergers have often followed *after* a depression; after the upswing was well under way. Mergers usually involve new stock flotations and immediate profit to somebody doing the floating. Depression times are not favorable for such operations.

The theory that great economies are to be achieved by merging two companies, both of which already have more capacity than they know what to do with, is largely a figment of the publicity man's imagination. It is safe to say that the economic sins which have been committed in the name of "mergers" are at least as numerous as the economies which have been derived therefrom.

Maybe there will be some mergers; we don't know. But we can't see any right now as "naturals."

Crazy Notion or a Possible Idea?

A NAMELESS correspondent to British *Motor* wonders "why car manufacturers do not make their windcreens and front pillars, in conjunction with one another, resemble the radiators of their cars." This practice would in his mind make the cars "more easily recognized, and appearance could be vastly improved." A sketch which accompanied his letter was reproduced in the July 19 issue of that publication and looked something like this:



The result is an unusual side view. Impractical perhaps but interesting, isn't it?—N.G.S.

Experiments Show Half of Fuel Wasted

The whole combustion process must be imagined as a forced succession of chemical reactions that follow one another with extreme rapidity

THE problem of increasing the efficiency of the automobile engine is an urgent one, first, because the unfavorable economic conditions of the times demand the most efficient utilization of fuel and, second, because some of the gases produced by incomplete combustion are poisonous.

With improved combustion the percentage of unburned fuel in the exhaust gas diminishes. In this connection it may be pointed out that hydrocarbon fuels on combustion in the engine cylinder are not immediately converted to their end products, carbon dioxide (CO_2) and steam (H_2O), a number of intermediate substances being formed which are capable of retarding the process. This gradual conversion of the

different fuels, usually referred to as the mechanism of combustion, varies with the composition of the fuel. Light gasoline, for instance, consists chiefly of the liquid hydrocarbons pentane (C_5H_{12}), hexane (C_6H_{14}), and heptane (C_7H_{16}). The processes of combustion of these compounds have been shown by extensive tests to be very complicated and that for hexane is illustrated by the diagram

Fig. 1.

The whole combustion process must be imagined as being made up of a forced succession of chemical reactions, which follow one another in quick succession. The principal intermediate substances produced are formic acid (HCOOH), formaldehyde (CH_2O), and hydrogen peroxide (H_2O_2). The formation of carbon monoxide (CO) as an intermediate product is particularly noteworthy. It occurs not only in the complicated combustion process of hexane, since in the combustion of pentane and heptane the intermediate products include ethylene (C_2H_4) and marsh gas or methane (CH_4), and, as shown in Figs. 2 and 3, carbon monoxide is formed in the decomposition of these compounds.

These facts explain the considerable proportion of carbon monoxide in exhaust gases from engines with poor combustion. This gas, because of its highly poisonous character and because, being colorless and odorless, it can be recognized only by its effects, merits serious attention. In this connection it may be mentioned that the poisonous effect of this gas is due to its affinity for the globin of the red blood corpuscles, with which it quickly combines, thus preventing the globin (a complicated proteid substance)

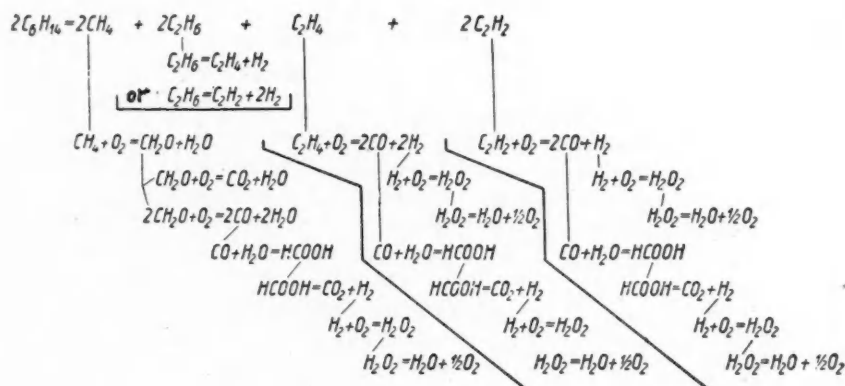


Fig. 1—Diagram of "mechanism of combustion" of hexane

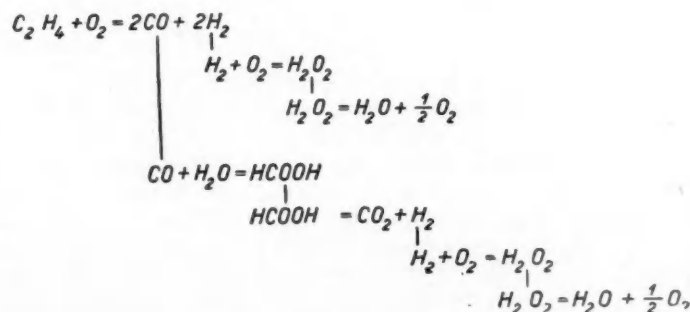


Fig. 2—Diagram of "mechanism of combustion" of ethane

Through Exhaust

by Oliver P.
Van Steewen

from performing its real task of carrying oxygen to the cells of the human body. In such cases one speaks of internal suffocation, since the cells fade for want of oxygen.

It has been proved that the exhaust gases of automobiles may contain such a high percentage of CO as to endanger health. Exact researches regarding the degree of noxiousness of CO by the Prussian State Institute for the Hygiene of Water, Soil and Air, at Berlin-Dahlem, have shown that the maximum permissible percentage of CO in the ordinary atmosphere in which persons must breathe is 0.02 per cent. Breathing in air containing 0.05 per cent of CO causes lasting injury to health, while breathing in air containing 0.37 per cent of CO means certain death when it is continued for about two hours.

Further investigations by the same institute have shown that the percentage of CO in exhaust gases is 4.3 on the average. In addition these gases contain components that are still combustible, such as hydrogen, methane and ethane. The properties of these gases are shown in Fig. 4, and it is interesting to note that the proportions of the gases present vary with the speed of the car.

A simple calculation will give an idea of the comparatively large amounts of CO produced in the combustion of hydrocarbon fuels. With a percentage of 4.3 of CO in the exhaust gases, one gallon of gasoline will produce 200 gal. of CO.

The economic aspect of incomplete combustion must also be considered. It has been found that the unburned fuel in the exhaust gas has a calorific value equal to 50 per cent that of the fuel from which the exhaust gases resulted.

In view of these figures, based upon practical tests, the demand for improved combustion appears wholly justified, and it is surprising that as yet no definite

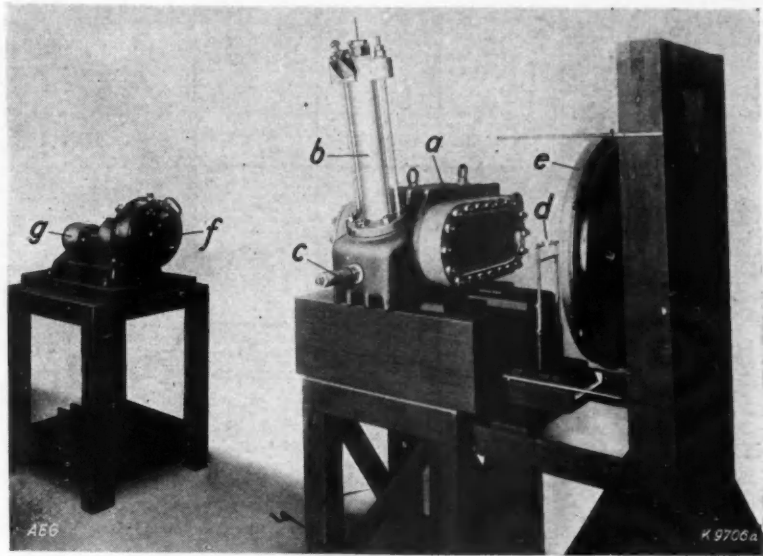


Fig. 5—Test equipment for the study of mixture formation in combustion chamber

steps have been taken with this end in view. An investigation of the process of mixing fuel and air is evidently necessary, but since the mixing processes follow one another at such close intervals, depending on the speed of the engine, it is very difficult to get pictures of single phases of the process.

A comparison may be made with the methods employed in the development of high-speed Diesel engines, in connection with which the problem of mixture formation has been given a thorough study. Some time ago a device was developed for investigations of the mixing process of fuel oil and air which enables all stages of the process to be recorded photographically. This device, which is illustrated in Fig. 5, could be

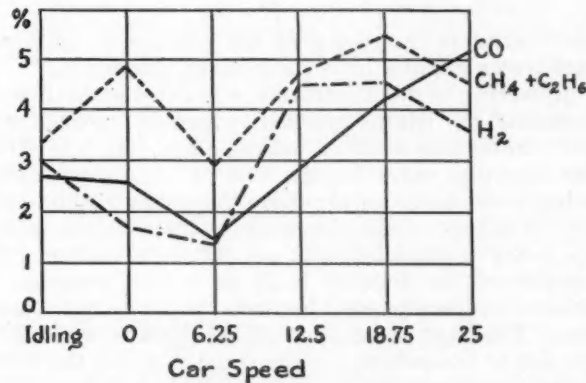


Fig. 4—Average percentages of carbon monoxide, hydrogen, methane and ethane in exhaust gases as dependent on car speed

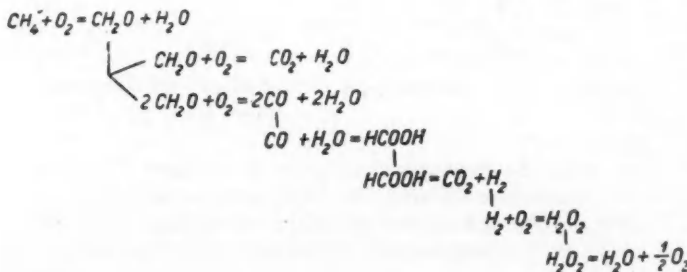


Fig. 3—Diagram of "mechanism of combustion" of methane (marsh gas)

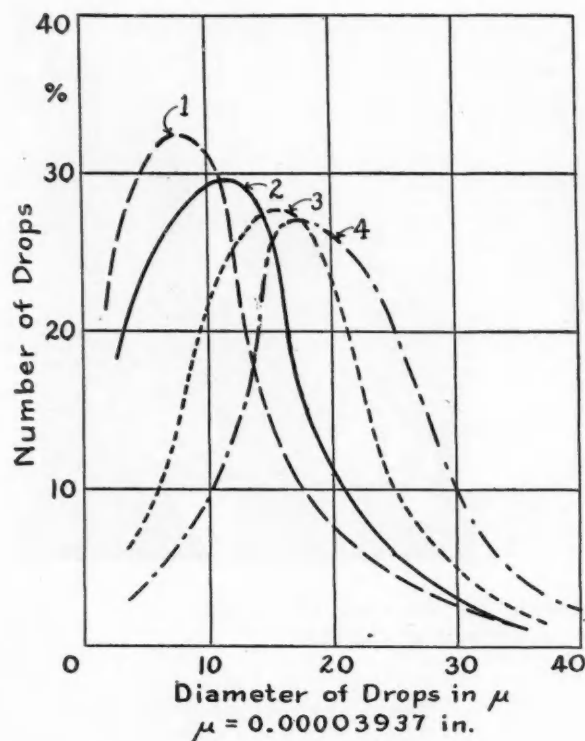
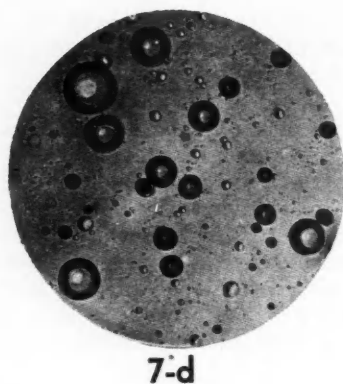
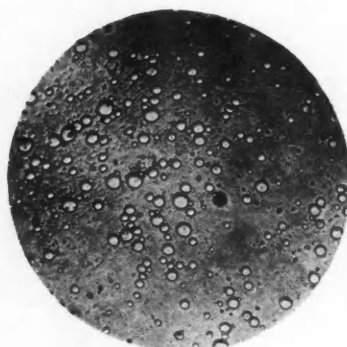


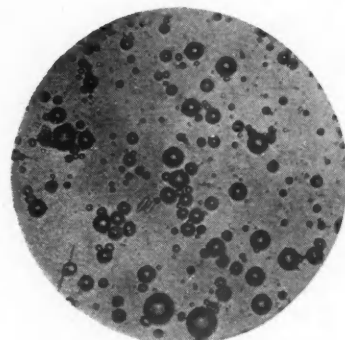
Fig. 6—Relation between diameters of droplets and their frequency in the spray



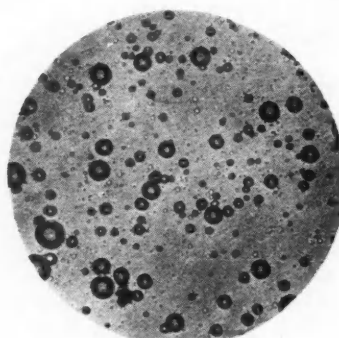
7-d



7-a



7-b



7-c

Fig. 7—Photographic record of spray droplets caught in glycerine cup for injection pressures of 2.22, 1.78, 1.40 and 0.953 tons p. sq. in. respectively

trating power of fuel jets in compressed air, and in this way visible records of the size and properties of fuel droplets was obtained for the first time. To ascertain the size of the droplets, which was of particular

made suitable for recording the mixture formation in carburetor engines by certain slight alterations.

Referring to the illustration, *a* is a cast-steel chamber replacing the engine cylinder, which is provided with two strong side walls of optical glass. At *b* is shown the injection valve for the fuel, while *c* represents a safety valve designed to relieve the pressure and to prevent breakage of the side walls of the chamber in case the latter is supplied with an excessive charge. The interior of the chamber is lit up for the exposure by means of a spark passing between the points *d* of a spark plug. The light passes through the chamber and strikes the film of the camera *f*. The speed at which the film is moved is adjustable, a variable-speed electric motor *g* being used for the purpose. The light rays produced by the spark at gap *d* are collected by the parabolic mirror *e* and projected into the camera.

The entire equipment is set up in a dark room, as mechanical shutters for the required frequency of exposure were not available, and successive electrical discharges of a transformer are employed. The objective of the camera remains open continuously during the test.

With this equipment, continuous investigations have been made of the degree of atomization and the pene-

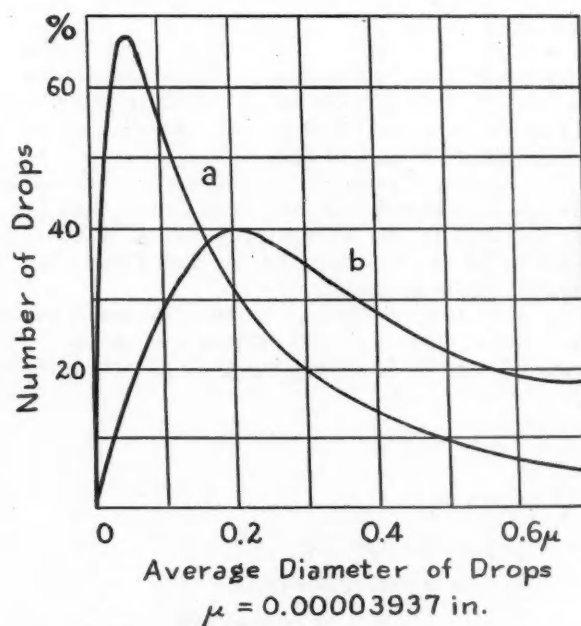


Fig. 8—Frequency diagram of droplet diameters. Curve "a" represents a desirable and curve "b" a less desirable degree of atomization

Fig. 10—Test equipment for microphotography of combustible mixtures for spark-ignition engines

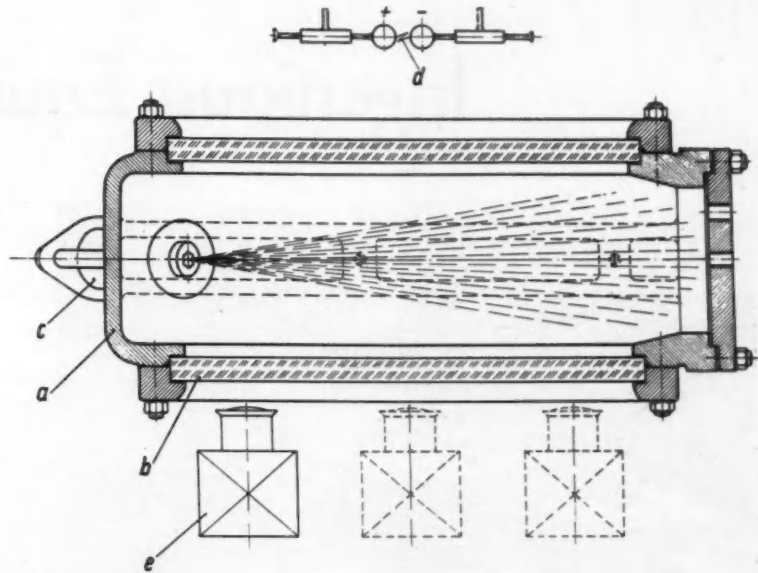


Fig. 9—Clipping from a moving-picture film of an oil spray in compressed air. Injection pressure, 300 atms.; chamber pressure, 15 atms.



interest, a cup with glycerine was placed in the chamber to catch some of them.

Fig. 6 is a diagram representing some of the results of the investigation, indicating how the frequency of the droplets varies with their diameter. Each curve represents a particular injection pressure. It will be seen that with each injection pressure droplets of a certain diameter (represented by the height of the peak of the curve occur most frequently, and droplets of both larger and smaller diameters occur in smaller numbers. Curve 1 corresponds to an injection pressure of 2.22 ton per sq. in. [what kind of tons the author unfortunately does not say—Editor]; Curve 2 to 1.78 ton p. sq. in., curve 3 to 1.4 ton p. sq. in., and curve 4 to 0.953 ton p. sq. in., the chamber pressure amounting to 0.064 ton p. sq. in. Figs. 7a to 7d show photographs of the droplets obtained with the different injection pressures. The relation between average size and number of drops is illustrated in Fig. 8, in which curve *a* represents a favorable and curve *b* an unfavorable degree of atomization.

That the quality of combustion is directly dependent upon the size of the droplets is apparent from the fact that only a very short time is available for the completion of the rather complicated combustion process. Assuming the average diameter of the droplets to be 0.004 in., it is 33,000 times as large in diameter as a carbon dioxide molecule. It is no wonder that this comparatively enormous-sized fuel droplet can be burned only incompletely in the small fraction of a second available for the purpose.

It was stated in the foregoing that the light from the spark-plug gap is projected through the atomization chamber and the stages of the atomization process are thus recorded on the film. Fig. 9 represents clippings from such films which give a good idea of the penetrating power of the fuel spray, the diameter and shape of the spray, the effect of the injection pressure, etc.

The equipment described can be used also for an investigation of the atomization of the fuel and of mixture conditions in carburetor engines. The arrangement of the equipment for this special purpose is illustrated in Fig. 10. The injection valve employed in investigations of spray phenomena is replaced by the carburetor *c*.

EDITOR'S NOTE: While no mention is made of it by the author, we understand that the equipment described in this article was developed by Dr. Fr. Sass of the German General Electric Company, Berlin, for research on fuel sprays.

2-Ton Mercedes-Benz Diesel Priced Higher

MERCEDES-BENZ now builds a 2-ton truck which is priced at \$1,438.70 if equipped with a Diesel engine and \$1,138.60 if equipped with a gasoline engine, the chassis being identical in both cases. This higher price is said to be fully warranted in Germany by saving in fuel costs, gasoline retailing there at about 36 cents a gallon.

The Diesel unit used in this truck is a four-cylinder engine of 100 mm. bore by 120 mm. stroke (3.94 by 4.72 in.) which develops 55 hp. at 2000 r.p.m.

It operates on the ignition-chamber principle, and the chief difference between it and older Mercedes-

Benz designs is that the axis of the ignition chamber is now at an angle to the cylinder axis. This arrangement, while directing the spray into the "center of gravity" of the combustion chamber, permits of the use of larger valves.

Complete with flywheel, exhaust manifold, and electric equipment, the engine weighs only 940 lb., or 17 lb. per hp., which is very close to the specific weight of truck-type gasoline engines. The b.m.e.p. is 96 lb. p. sq. in. Many parts of the Diesel and gasoline engine of this truck are interchangeable, although one is of the valve-in-head and the other of the L-head type.

Ingenious Equipment Speeds Up Export Plant

by Joseph Geschelin



SMOOTH-FLOWING, a line of packing cases bound for foreign ports crosses a long conveyor headed for the loading dock. Unseen, quick-acting mechanisms galvanize into action as a packing case reaches the junction point. Suddenly it tilts, slides onto the long conveyor chain and starts its journey to the loading dock. Mechanical ingenuity has substituted a tireless, automatic mechanism for back-breaking mechanical labor. That's our first peek into the industrial soul of the Chester Works of the Ford Motor Co.

Inspired by the modernity of the plant, the rich variety of labor-saving devices and innovations in procedure, one could write volumes of copy and still leave the picture incomplete. For this reason we have chosen to set down some of the high spots which impressed us particularly as we made the rounds of the production lines pictured in Fig. 1. The few unusual bits of equipment shown here as well as the methods that go hand in hand are sure to hold a peculiar appeal to men interested in the production lines of the industry.

As shown in Fig. 1, the Chester plant follows the general line of Ford assembly plants and methods as described in *Automotive Industries* from time to time. However, the distinction of this plant is the export division which is said to handle about 80 per cent of all Ford products which find their way to foreign customers. Under normal conditions, this division alone employs in excess of 950 men.

This plant houses a complete body-building line, trim line, and paint line. The main assembly line with its many sub-assembly stations boasts a number of features which will be taken up in detail later.

Much has been said by eminent authorities on the psychological and physiological effects of good lighting and clean, light, workplaces. Certainly the first impression one gets in looking around even casually is the general air of cleanness, of fresh paint generously

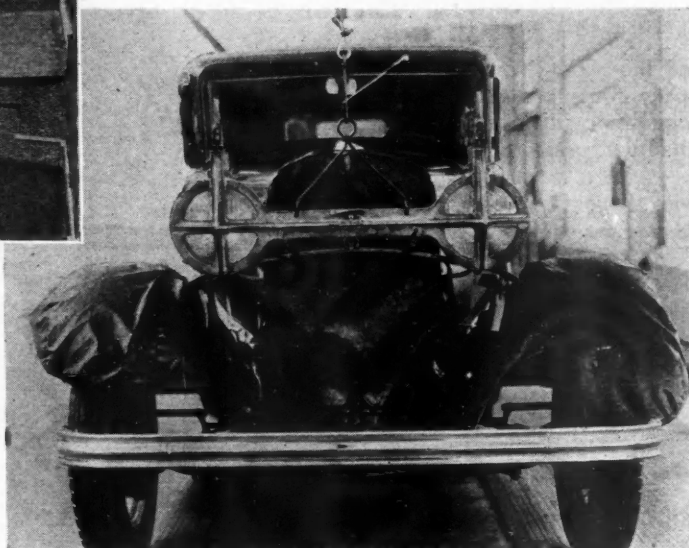


Fig. 2—Headlamps quickly and accurately adjusted by means of this simple fixture. Quick acting clamps align the lamps on center while the principal axis is located by a spirit level on the fixture

laid on. The powerhouse which generates the current turning the wheels of this great plant is a revelation in itself, reminiscent of the engine room of a crack Atlantic liner with its polished tiles and immaculate brass. Then there is the huge oven in the export building used for nothing but baking the anti-rust on sheet metal, yet rivaling the spick and span exterior of the finest baking oven in a cake plant.

Rolling off the assembly lines under their own power, the completed cars are driven for a workout on the proving grounds along the water front. Each car runs the gauntlet of a tough course designed to bring out the little defects that might trouble the owner.

Reversing the usual process let us start at the end of the assembly line. Note first of all that it terminates in a long escalator consisting of a broad conveyor belt on each side of the chain. Its purpose is two-fold: it provides a working platform for the final assembly operations and inspection; but most important of all it sets the car on its four wheels in a normal position thus permitting the proper alignment of doors. This licks an unusually stubborn problem.

As we stood here, subconsciously we looked for two usually important final inspections—lights and wheel alignment. Although both seemed to be conspicuous by their absence, they are well under control. If you look up above the escalator you will see the headlamp aiming fixture shown in Fig. 2, suspended overhead on

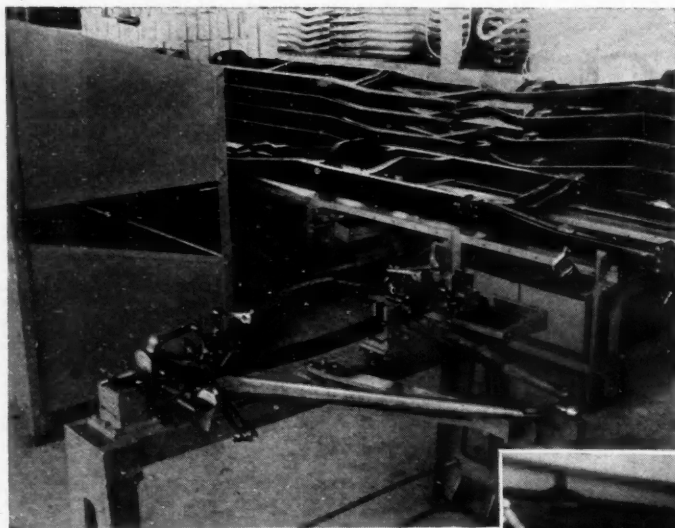
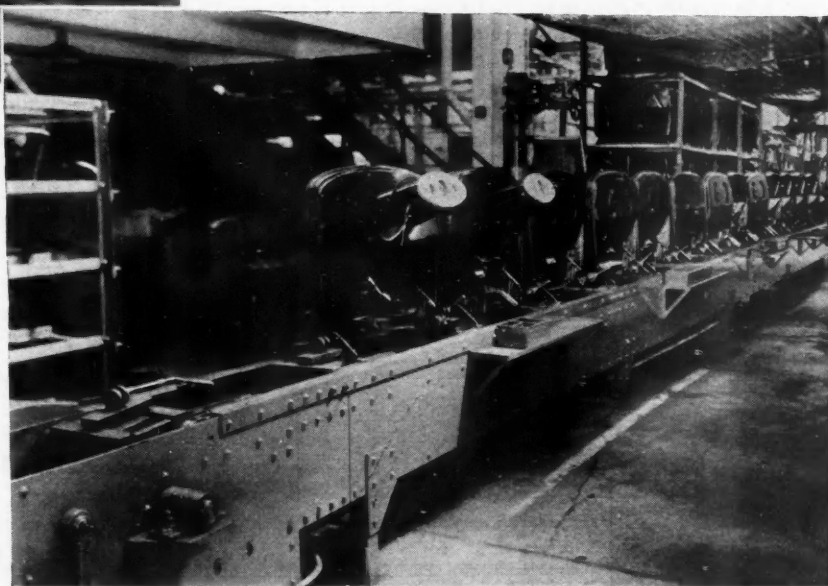


Fig. 3 — Alignment of front wheels achieved on the fixture located at the side of the main line. The right-hand block is movable, transferring the motion to a pivoted arm. Adjustment is taken from limits of $\frac{3}{8}$ in. movement of the arm

Fig. 4—The short, mechanized sub-assembly line for building up dash assemblies



evident from Fig. 3.

This station is handled by two operators who receive the entire front end assembly with tie rod ends loose. The steering knuckle at the left is set into a fixed bracket while the one at the right fits into a pivoted bracket whose movement is reflected and measured by a pivoted arm shown on the table directly behind the right-hand knuckle. For adjustment the pointer is free to move about $\frac{3}{8}$ in. between the extreme right-hand edge of the board and a marker $\frac{3}{8}$ of an inch in. The vertical inclination of the entire assembly is controlled by the sliding bracket on which the ball end is shown resting. By changing this bracket, the fixture is immediately converted to the adjustment of commercial car and truck assemblies.

Fenders and other sheet metal for the running gear are bonderized when received at Chester. They go through a baking operation, rubbing and enameling. The shell and hood are lacquered to match body color ensemble, the operations from the white metal being performed completely on two separate decks which are raised considerably off the floor level.

One of these decks is located convenient to the assembly line, enabling the operator to hand the proper color combinations right to the assembly station. This eliminates the use of a feeder conveyor, reduces the inventory of finished banks, and simplifies the handling of sheet metal.

Following current practice, sub-assembly stations are located directly at the main line at points of assembly. The novelty at Chester is the use of short, mechanized conveyor lines for facilitating and speeding up certain sub-assembly operations. Illustrative of this is the dash assembly line shown in Fig. 4 which accommodates the variety of dash and instrument board assemblies required for the V-8, the four, and the various commercial options.

Naturally the building schedule of this line dovetails perfectly into the movement of vehicles on the

main line. To this end, each unit is identified by a numbered tag which matches the tag on the chassis. As the completed assembly reaches the end of the line, the movement of the conveyor is automatically stopped.

Wheel and tire assemblies travel on overhead conveyor chains which dip to a level within easy reach of the operator at the assembly point. One of the most interesting pieces of equipment in this connection is the automatic tire inflation machine. This is a six-station merry-go-round affair with the air reservoir at the center. Air at the required pressure is led to a circular manifold with a short section of valve hose leading to each of the six stations. Two operators handle the machine. One loads the wheel and attaches the air hose; the other removes the wheel and tire assembly. The required amount of air enters during the interval.

It was quite troublesome originally to remove the skids on which bodies travel during the major part of their trip through the paint shop and trim. The solution is offered by the ingenious deskidding machine shown in Fig. 5. The finished body is rolled to this station on a carriage which runs on rails shown dimly in the background. When transferred to the deskidding fixture, the body, still mounted on skids, is rolled directly on the two side rails (one of which with its short rollers is shown in the foreground). At this stage the side rails are raised slightly above the con-

veyor chain. The body now is pushed forward to engage the storage conveyor and at a movement of a foot treadle, the rails move downward, leaving the body on the chain while the skids rest on the rollers. The skids then are removed by the operator and the cycle repeated. This fixture greatly facilitates matters and preserves a lot of shoes and feet.

The paint house holds much of interest to automotive production men. Fire hazard has been reduced to the vanishing point by the simple expedient of moving all driving motors outside of the building and driving the equipment by belt from line shafting. Even the incandescent lamps are encased in protective glass globes.

The same painstaking attention to detail so evident throughout the assembly lines is carried into this building. Here in one corner a number of paint cans are strapped in a simple cradle and tumbled at a fair rate of speed until needed. In another corner, a larger sized tumbling fixture is agitating several large drums. To stir things up more vigorously and eliminate even small losses due to thickening on the sides, they have found it expedient to drop some lengths of chain into each drum and let the chain slosh around with the movement of the tumbler. It is claimed that these simple expedients not only have resulted in greater economy but have improved quality to a great extent.

Completing this brief excursion along the assembly lines we enter the export building which under normal operating conditions houses the activities of about 950 employees and handles over 80 per cent of Ford exports to foreign countries. Among the by-product activities in this division is that of salvaging old crates and lumber. Everything is knocked apart, nails removed, and the lumber sorted according to size and condition. It then goes to experienced operators who cut it up into standard sizes.

To prevent the rusting of sheet metal parts while on their long journey over the seven seas, all sheet metal parts are rust-proofed by treating with a special non-inflammable compound which is sprayed on while the parts move on a conveyor through a large spray booth. Upon leaving the booth, these parts continue into a

huge baking oven where the rust-proof coating is heated until it coagulates to a thick, tacky consistency. Both the spray booth and oven were built by the plant maintenance department and give excellent evidence of the craftsmanship of the maintenance group.

Nothing is left to chance in filling orders for export. Errors are eliminated by a very simple but effective expedient. Going through the building one finds a series of large display boards set upright on the floor, each mounted with a group of individual parts representing some unit of the car. Each part is identified by its proper part number. Before the packer fills an order you will see him come up to a board and match the part carefully with the sample. Certainly a mighty fine way of preventing the shutdown of an assembly line some thousand miles away.

Crated parts leave the export building on a floor-level chain conveyor which crosses the loading dock conveyor just outside the door. At the junction of the two the crate is shifted automatically by means of the mechanism shown in Fig. 7. The visitor is stopped by the seemingly uncanny operation of this fixture. No fuss, no noise, yet as the crate is over the junction of the two conveyors, the short line stops, an inclined roller section rises and tilts the crate directly onto the long chain which carries it to the loading dock.

Here is the way it works. The floor conveyor out of the export building is found to have short metal projections fixed at regular intervals. The trick is to set the crates approximately midway between two of these projections. To the right of the fixture, outside of the range of this picture is an underground station which houses a control mechanism. As the projection enters this station, it trips a limit switch which simultaneously stops the conveyor and actuates an electro-

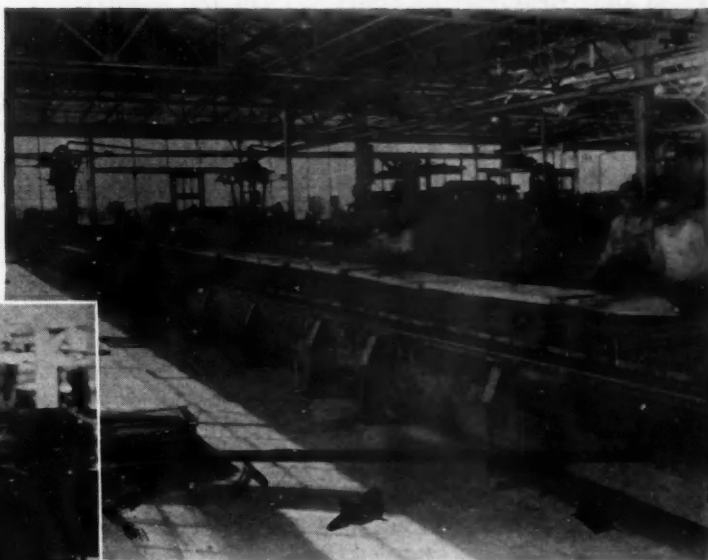
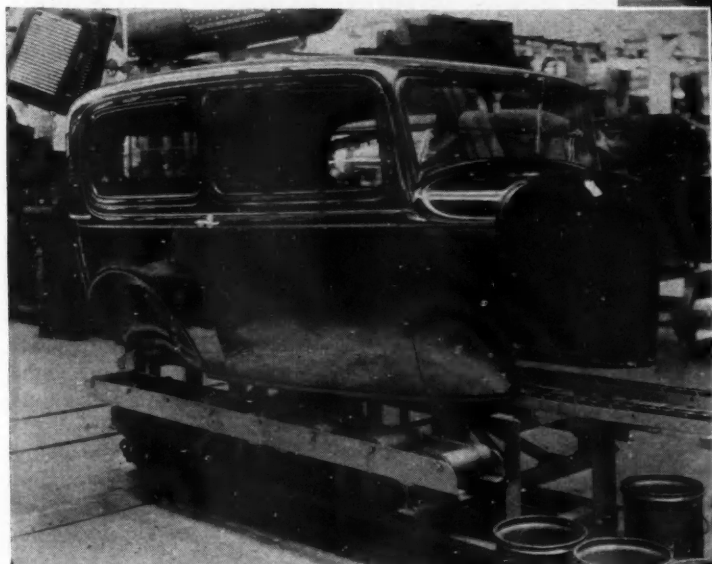
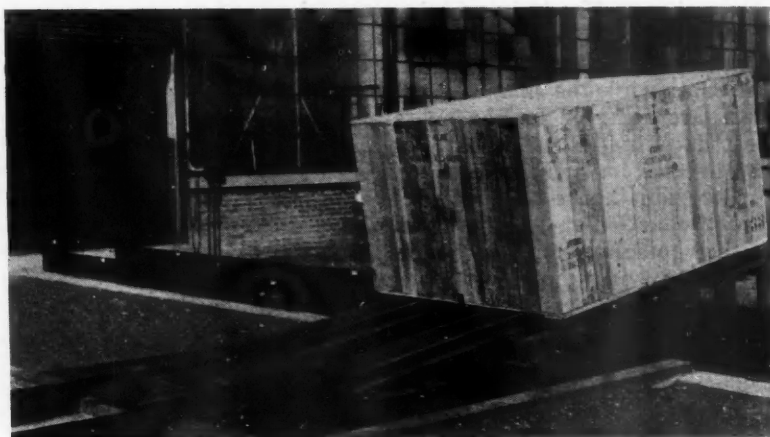


Fig. 6—A moving work bench in the export building. This slat conveyor facilitates the building of sides for crates and boxes

Fig. 5—To preserve shoes and feet while transferring bodies to the storage line, this ingenious deskidding machine was developed. The body rolls on the side rails which are then dropped and the skids taken off

Fig. 7—This one stops 'em. It is the automatic transfer station which shifts the crates from the export building conveyor to the chain leading to the loading docks



magnetic device operating the hydraulic lift under the inclined plane. The cycle is so timed that as the crate leaves the inclined plane, the hydraulic lift begins its downward stroke while the conveyor starts again. And so on, all day long without interruption and without a human hand to guide it.

It occurred to us that the scheduling of the assembly line operations in this plant might be of great interest. And so we found when viewed broadly. It works approximately as follows: there is a general 30-day building program to establish a regular flow of standard units such as bodies, trim, frame assemblies, etc. Each day a master schedule is made up two days in advance upon instruction from the sales department giving the exact specifications of the cars to be built that day. Copies go to a number of key stations such as the frame assembly, steering gear, body department, engine line, etc.

Each item on the master sheet is numbered and this number is transferred to a tag which is attached to the given unit. Wherever necessary, the tag also specifies special instructions such as body color and type, engine

type, wheel color, etc. As mentioned earlier, hood and shells are made in color according to the definite schedule but instead of routing on conveyor, the proper set is handed to the line as the chassis approaches the station.

In passing it might be noted that a part of the philosophy behind the operation of this plant is that progress is founded upon constant improvement, constant refinements in equipment and methods. Everyone is alert to the little details which may facilitate operations, reduce cost, or improve quality. As this is being written a major change has been effected in the body line.

To improve the quality of the paint job, the factory organization has just worked out a new scrubbing deck featuring an improved chemical cleaner which is expected to thoroughly clean the metal surfaces and thus eliminate any possibility of rusting under the finish. From the scrubbing deck the bodies will pass through a baking oven which has been incorporated directly into a bridged opening so as to utilize a passageway for a productive operation.

Gasoline Tax Evasion Becoming Major Racket

GASOLINE tax evasion, that has assumed the proportions of a major racket to the detriment of state treasuries and the disruption of the oil industry, is meeting with stiffened resistance on the part of law enforcement agencies, according to advices received by the American Petroleum Institute. As aids to state officials, municipalities are joining in the campaign with stronger ordinances and increased vigilance. An ordinance to prohibit the delivery of gasoline within the city limits between the hours of sunrise and sunset was enacted recently in Fort Worth, Texas, and in the same city District Judge Bruce Young granted an injunction restraining a filling station operator from selling falsely labeled gasoline that had been mixed.

The city of Dallas, only a few miles away, recently began enforcing a similar ordinance that had been enacted several years ago. Gasoline running by "blind" trucks at night is becoming as popular a pastime with the gasoline "bootlegger" as is the running of liquor under similar conditions by his better known brother, the alcohol bootlegger. It is anticipated that the recent actions of Fort Worth and Dallas will do much to put a stop to this practice in the vicinity of these two cities and make easier the collection of taxes due

the state on such gasoline as is delivered there.

The city of Washington, D. C., recently found that hucksters were peddling gasoline from trucks parked in the streets. Because of the mobility of these trucks, this practice rendered it extremely difficult for the authorities to check up on each one, ascertain the origin of the fuel, and determine whether the tax imposed by the District of Columbia had been collected in each case. Here a police regulation forbidding the delivery of gasoline from trucks to retail purchasers on the street, except in case of emergencies, was all that was needed to put a stop to this practice.

Cincinnati has only recently enacted an ordinance—carrying an emergency clause making it effective immediately on passage—which provides for the punishment or fine of those guilty of mislabeling or adulterating motor vehicle fuels and lubricants. By adulterating tax-paid gasoline with tax-free kerosene or some other product, the evader frequently sells as high as two gallons of fuel to one gallon of gasoline, collecting the tax on both when he has paid the tax on only one gallon. This ordinance also carries a provision prohibiting the sale at retail, from a tank truck or other vehicle used for transportation of liquid fuels, of any volatile liquid fuel.



Courtesy, Monarch Machine Tool Co.

PRODUCTION LINES

Motors are Discussed

Multi-speed squirrel-cage electric motors are discussed and illustrated in a six-page bulletin released by the Wagner Electric Corp. It features many practical examples and shows their solution. The description covers constant-torque, constant-horsepower and variable-torque motors, further classified as two-speed, three-speed and four-speed motors. Ask for Bulletin 174, part 5, pages 13 to 18.

New Feathers

Industrial Standardization (formerly A.S.A. Bulletin) is the new name of the monthly review published by the American Standards Association. It starts with the current issue for July.

Here's How

Schools, public institutions and business organizations may now see how an all-steel body is built. It's all shown in a film which gives the story from the mining of iron ore to the fabrication in the body plant. Copies of the film may be obtained from the Pittsburgh Experimental Station of the U. S. Bureau of Mines.

Decibel or Dingbat

One of our friends in the industrial engine business writes to ask what's being done about the measurement of noise in engines. How would you establish a standard of quality? How would you measure it? The way it is now, it's just about the same as telling a tool maker to turn

up a shaft 2 in. plus or minus a hair. Just depends upon the animal he pulls the hair out of. For instance, in his plant, one specification tells the inspector to stand 3 ft. away and if it sounds all right let it go. Let's have some suggestions from people who have been working with acoustimeters lately. Or any other good quantitative methods.

Production Men

This is your page.

Any suggestions you have on new methods or kinks may be of value to men in other factories.

If you are working on some new development, we'd like to know about it—even if not for publication with your company's name.

Elusive Spots

This may not be important but it's a good example of technical sleuthing. It seems that a ball bearing manufacturer was having trouble. Finished bearings were packed with grease under air pressure, wrapped in waxed paper, put on the shelf. OK so far. But after setting on the shelf, both races were found to be pitted. Ultimately a couple of research men got on the job. They found first that the pitting occurred in uniformly spaced spots, invariably. And to make a long story short, it was concluded that the grease got into the bearing, packed in tightly between the balls, but did not get under the balls. Evidently

there was sufficient moisture in the air stream to cause corrosion. The solution was to give the bearing a half turn after the grease was pushed in.

With the Eye

Seein' is believin'. So the Jeffrey Mfg. Co. shows its stuff in pictures in catalog 540 which is just off the press. A complete brass foundry and several steel foundries are shown in perspective and briefly described. Another section takes up special items of equipment such as flask fillers, core handling, mold conveyors, etc. For a good picture of modern foundry equipment we recommend a reading of "Jeffrey Foundry Equipment."

Take Your Pick

A complete line of interchangeable counterbores and spot-facing tools has been brought together in an interesting catalog. Special and standard forms. Suggestions. All got up in convenient handbook style. If you use tools ask for Continental catalog CT 132.

Don't Miss It

An ambitious editorial program is announced in *The Durez Moder* for August, 1932. It consists of a series of articles on mold construction by E. R. Heckman. Each installment will discuss in detail some single type of mold. Here is genuine service to the tool makers of a rapidly expanding industry.—J.G.



Ford Offering Vacuum Clutch Control, Brake Booster Unit

Detroit dealer is quoting installation for \$24.25, including \$18 for equipment

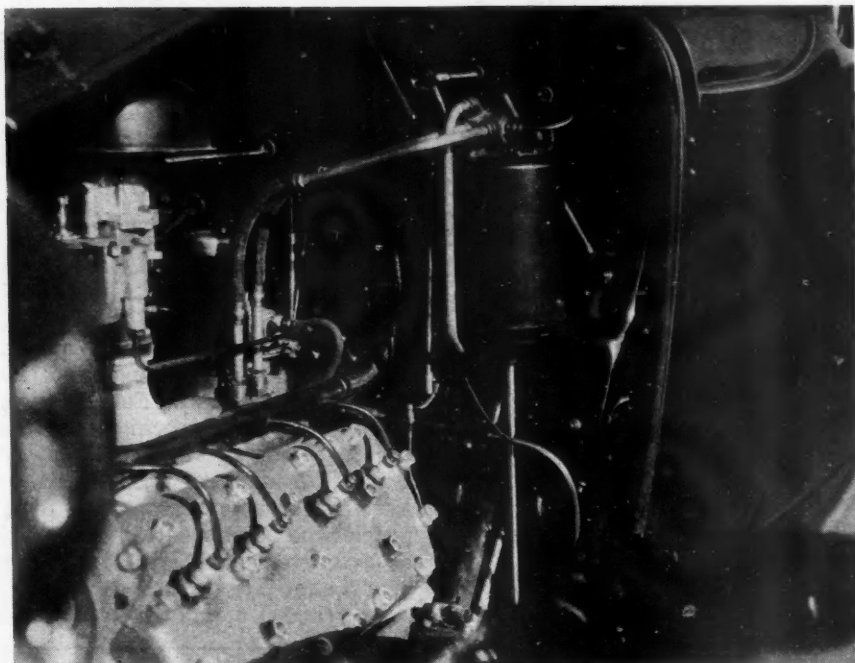
by Athel F. Denham

A VACUUM control unit which performs the functions of an automatic clutch control, and a vacuum brake booster, is being offered on the V-8 by the Ford Motor Co. through at least one dealer in Detroit. At the present time, at least, the units are being installed by the dealer and are not coming through on cars from the factory. The cost of the unit, installed, is quoted at \$24.25, including \$18 for the unit and parts required.

As will be noted from the photograph, the single vacuum cylinder is mounted on the dash. On top of the cylinder is a three-way rotary valve, with linkage connecting to both the accelerator and brake pedals. Of the two pipe and hose connection lines running to the engine, the forward one extends down into the intake manifold. The piping to the rear is a breather line connecting to the valve chamber housing.

On exhaust strokes from the cylinder it therefore serves as a silencer, while on the "intake" or power stroke it sucks in oil vapor loaded air, so that the cylinder and valve are in effect automatically lubricated from the engine. Evidently the installation of such a unit has been in the mind of Ford Motor Co. engineers for some time, since all V-8's have been coming through with the tapped holes (plugged) in the manifold casting, to which the unit is connected.

While the action is rather difficult to explain without more detailed illustration, it can be pointed out that the first part of the stroke of the piston operates the clutch throwout, while a continuation of the stroke turns the unit into a vacuum brake booster. Apparently the top part of the stroke is controlled through the accelerator pedal in a fairly normal manner, while application of the brakes



Chilton Staff Photo

Single vacuum cylinder of Velvet Power clutch control and booster brake unit

opens another orifice in the rotary valve, permitting the piston to continue its travel.

The piston rod incidentally has an ingenious mounting in the lower end of the cylinder, permitting to make an oscillating motion while moving down or up, such motion being produced, of course, by the changing position of the crank lever to which the piston is connected at its lower end. In effect the lower end of the cylinder contains a sleeve-type bearing for the rod, which sleeve is flanged and produced in such a manner that it is "self-centering."

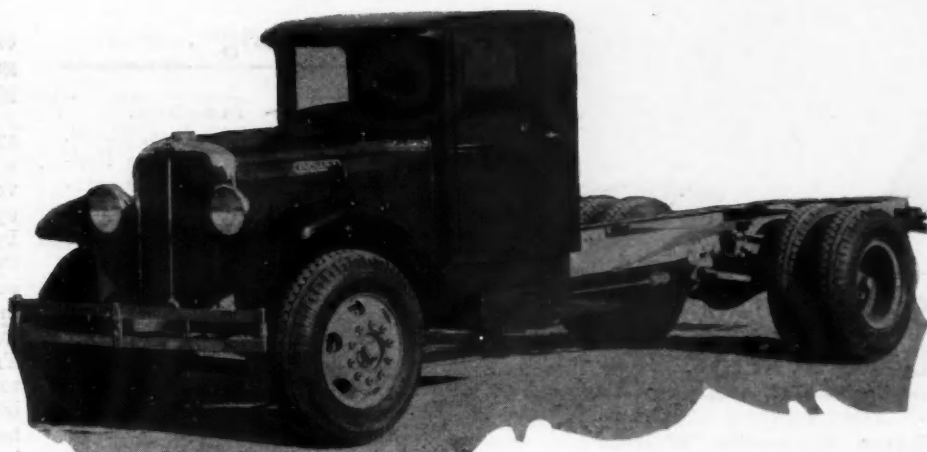
The action of the unit illustrated is cut out by pulling out or pushing in a button on the dash in the conventional automatic clutch control manner. The linkage for this is shown just above the cylinder. It is understood that a later type has been developed on which the clutch control feature can be cut out without affecting the use of the unit as a vacuum brake booster.

The installation is provided with several adjustments. The major adjustment for the brake action is in the control linkage. By means of a little set screw the action of the booster can be varied for any desired pedal "feel," from virtually zero, up to no apparent action.

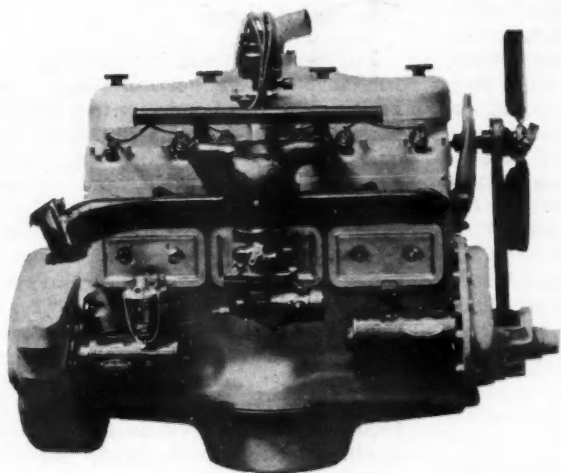
It is understood that the vacuum cylinder and control valve are a product of the Velvet Power Brake Co. of Detroit, while the linkage, piping, special clutch pedals required, etc., are produced by the Ford Motor Co.

New Indiana Offering First American Stock Truck With Diesel Power

Diesel-powered Indiana
5-ton truck



Exhaust side of Cummins 125-hp. engine



A FIVE-TON truck equipped with the Cummins Diesel engine has been introduced on the market by Indiana Motors Corporation, Marion, Ind. The chassis, known as Model 47, weighs 9100 lb., and the truck has a gross rating of 28,000 lb. Other chassis units include a two-plate clutch, a transmission with four or more geared speeds, a double-reduction axle and air brakes. An option is given on two sizes of balloon tires, viz., 10.50/20 and 11.25/20, rear wheels carrying dual tires in all cases.

The engine is a six-cylinder, $4\frac{7}{8}$ x 6 in. developing 125 hp. at 1800 r.p.m. Its weight is said to be only slightly greater than that of a gasoline engine of similar rating.

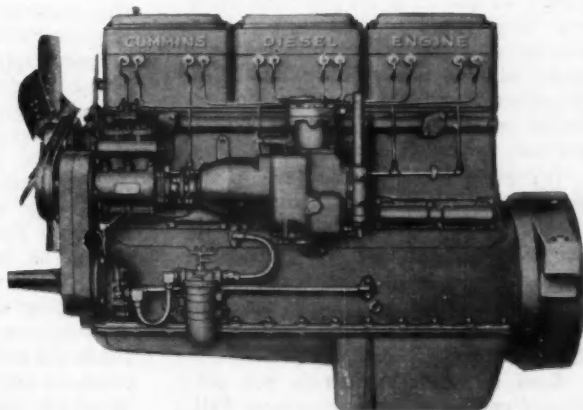
The fuel pump and governor are built as a single unit mounted on the left side of the engine, which is removable without disturbing other units. It is pressure-lubricated from the main lubricating system of the engine. The fuel pump is of the Cummins distributor type, which meters the charge to each cylinder by a single metering plunger for all cylinders. Oil is

delivered under relatively low pressure from the pump to an injector at the head of each cylinder.

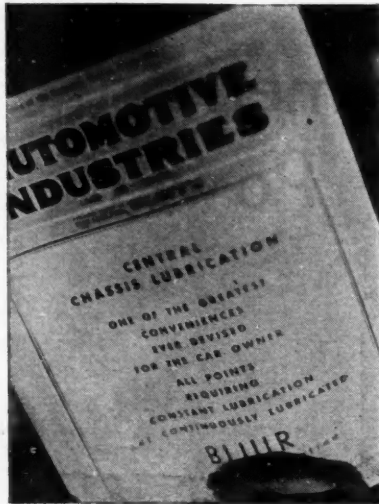
Cylinders and crankcase of the engine are cast integral of alloy iron. Removable cylinder sleeves are employed. The crankshaft is carried in seven interchangeable main bearings and is forged from alloy steel with counterbalances. The piston pin bearings are pressure lubricated through a rifle-drilled hole in the connecting rods. Pistons are of alloy iron carrying four compression rings and one oil control ring.

The camshaft is supported on seven bearings and is drilled to serve as the main oil distributing line. The oil pump is mounted on the left side behind the timing gear case and may be removed without disturbing other parts.

The water pump, which is integral with the fan, is driven by a double vee belt from the accessory shaft. Its intake passage is cored in the block, the opening being near the radiator outlet.



Pump side of Cummins six-cylinder engine



Suggests New Brake System

EDITOR, *Automotive Industries*:

So long as automobiles continue to run on four rubber-tired wheels—the frictional contact of which with the road surface is a variable and dependent upon the material out of which the surface is made—the 100 per cent safe and efficient brake mechanism is one that will meet the following specifications:

(a) Notwithstanding the fact that the tire to road friction is a decided variable, this mechanism will be able to utilize all the weight of the car in stopping without locking any one or more wheels before all of them.

(b) It will always be kept in the most efficient condition of adjustment by automatic means, this means being able to detect and adjust the weakest brake before the others.

(c) It will always maintain a balance between right and left brake forces of each axle at all times, even to the correcting of errors of balancing which may develop during any one brake application.

(d) When the frictional holding power of the tires on one side drops, due to possible mud, snow or other causes, and the wheels on that side lock and slide as a result of brake application, it will act to ease up on the brake power of the opposite side to prevent danger of a side skid.

(e) Should a side skid develop this brake mechanism will act to check the skid without any assistance from the driver.

(f) It will be automatically lubricated and will require no servicing other than renewal of the lining when it is worn out.

Such a brake system is not only theoretically possible but commercially practicable and will be forced upon the automobile industry by the constantly

mounting speeds of travel. At high speeds the driver cannot always act quick enough to remove the dangers resulting from imperfect brakes.

GEORGE L. SMITH,
Engineer,
U. S. Ordnance Co.

Wants Better Driver Testing

EDITOR, *Automotive Industries*:

I have read with interest, R. B. Stoeckel's article regarding the limitations of speed capabilities of automobiles, and perhaps my views, gained in over 25 years of driving, covering over 250,000 miles, might be of interest.

Human Nature to Speed

It is very trite but true to say that there is so much of a difference in the capabilities of individuals, both in judgment as well as in ability in the handling of a machine, that one man might be a safer driver when traveling at 60 m.p.h., than another, in the same machine and on the same road, at 40 per. Yet there is hardly a man who does not consider himself a "Barney Oldfield," even though the one-horse shay would not be safe in his hands. It is also human nature to "step on her" when conditions (in his or her mind) seem favorable. The question of capability of the driver is of no importance in this state, where anybody, be he deaf, dumb, or blind, is allowed to operate an automobile or truck, there being no driver licensing law.

Speed With Judgment

Being an habitually fast driver, one who drives at 50 miles and better, even when not in a hurry, I believe that speed in itself, when used with judgment, is not dangerous. And, of course, one's own personal judgment is always the best. I shall not dwell on the question of the adequacy of the maintenance of the car, because any car which is not maintained in proper condition for operation at high speed is dangerous, even when operated at low or moderate speeds. In this respect most state laws (and they should be nationally uniform) are totally inadequate, nor am I going to propose a system of car inspection, though I thoroughly believe that this should be, and will soon have to be, done. Nor will there be any good in legislating old cars off the roads. I am convinced that one of my cars, 10 years old and run in excess of 110,000 miles, is every bit as safe to drive at 50 m.p.h. as my 1929 car, and safer at higher speeds, on account of its inherent better road holding qualities.

The F

Needless to say both cars are maintained in excellent condition, and the old car has been modernized in regards to four-wheel brakes and improved steering.

I am strictly against limiting the speed capabilities of cars because there are times when one needs all the advertised speed, as well as the actual speed, that can be obtained. In fact I am interested in the acceleration between 40 and 60 m.p.h., and for this acceleration one needs power, much more power than is required to maintain a speed of 60 m.p.h. on level roads. True, the addition of a supercharger to a smaller engine would permit these bursts of speed, even if they could not be maintained, but the car would still have this maximum speed capacity.

Plan Not Rational

Furthermore there is no rational or fundamental engineering basis for limiting the speed capacity to a weight ratio. Weight is not an inherent requirement to roadability at high speeds. It is possible, and rather easy, to design a light, short wheelbase car to have as good, if not better high speed stability, than our present heavy cars, and it is not necessary to go to rear engine mounting and "Tear Drops." Our 1800-lb., 100 in. wheelbase racing cars are examples, if you need any convincing. It is safer to drive one of these at 100 m.p.h. than a 4500-lb., 145 in. wheelbase sedan at 70 m.p.h. on a smooth road, smooth enough not to "bust" the racer to bits.

Offers Three Factors

Therefore, in my opinion, to obtain safety with high speeds (and we are going to get even higher driving speeds as time goes on), we must concentrate on three factors: 1. Strict maintenance of cars. 2. Safer roads. 3. Better drivers. The first two are comparatively easy to solve, the latter seems impossible. However, let me suggest a few things that might improve our drivers:

1. Rigid personal license of drivers and both physical (heart, eyes, and ears) and driving ability examination, yearly.
2. Physical quickness of reaction tests to determine ability of driver to do the actions that his eyes "telegraph" him to do. Drivers rated on their license cards in accordance to their speed of reaction.
3. Limit drivers to maximum speeds

e Forum

in accordance with their reaction rating, regardless of the type and size of the car. Proof of excess speed used beyond their allowance, in case of accident, revokes their license.

4. Strict inquiry as to judgment used by driver when involved in accident at high speeds (or excess of legal speed).
5. Revocation of car registration certificate and suspension of owner's license for cars found sufficiently faulty or dangerous to operate. Car can be reregistered upon passing inspection after adequate and permanent repairs. Length of time for license suspension dependent upon seriousness of car faultiness.
6. Uniform system of hand signals and strict adherence to their use before changing direction of car travel.

I admit that some of these suggestions will be very difficult and may be impossible to put into effect, but are offered as possible, if not probable, methods for accident reduction, especially at high speeds.

THEODORE MAYNZ,
Consulting Engineer,
Cleveland, Ohio.

Two-Stroke Engines With Trunk Valves

EDITOR, *Automotive Industries*:

Now Joseph Schaeffers presumes to question my reference to the use of the word "new" as applied to an obsolete structure disclosed in 1906.

Regarding "exhaust-inertia" and its control, he says, "on the contrary, it is advisable to provide a brake against too free exit of the exhaust into the atmosphere." Is that a solution or was it a makeshift to compensate for failure to understand port conditions? The writer did not when he decided values and went out of the way to do so regardless of precedents in 1906.

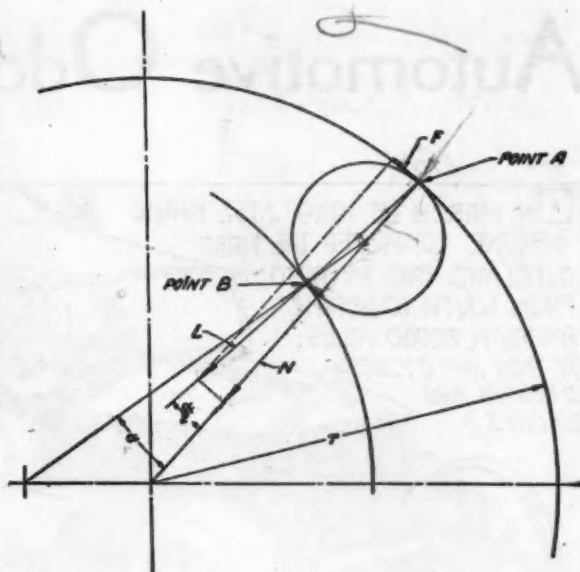
As for the uniflow principle, Todd invented that for a steam engine and it was used to relieve the exhaust and was in no way a "brake."

Quotes Greewich

As for the trunk engine, John Penn Greewich, England, developed that for warships to get an engine low. "Trunk engines were used on the

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The Forum's facilities are yours.



earliest British warships." The heat loss from the large surfaces of the trunks exposed to the steam and atmosphere was very great. How about the Schliha losses due to the trunk?

J. S. says, "The truncated piston—eliminates the weak spot in the center of the piston head. The ring-shaped piston head is effectively cooled by a steady flow of fresh mixture," and as a direct result the mixture is superheated. Is that advisable as a means of obtaining power and will a hot mixture stand high compression?

J. S. admits the piston diameter is "some 15 per cent larger," what is the increase in surface due to the trunk as an energy dissipator?

James Watt in 1765 decided a hot cylinder and a cool condenser would save steam. Would he reason differently today? And in 1784 I find a Throttle identical to that used in the modern auto; Watts theories as to conserving heat and utilizing it are admitted today.

JAMES MCINTOSH.

Calculates Roller Load

EDITOR, *Automotive Industries*:

In Austin M. Wolf's paper, "Free-Wheeling Devices and Their Control," presented at the recent S.A.E. summer meeting, the author gives the following formula for calculating the load on rollers used in roller-type free-wheeling devices:

$$L = \frac{T R}{r n} \cot a$$

I should like to call attention to the fact that this formula is not correct, the results obtained by it being about one-half of the actual loads carried by the rollers.

Let

T = maximum engine torque in lb.-in.

R = transmission low-gear ratio

n = number of rollers

r = inside radius of shell in in.

a = angle between tangents of the roller at its lines of contact with the cam and shell, in degrees

F = tangential force at the line of contact between roller and shell, in lb.

N = normal force between roller and shell in lb.

L = resultant load per roller, in lb.

In order to transmit the torque

$\frac{T R}{n}$ from the shell to the cam by

means of one roller, the tangential force (friction) at the line of contact between roller and shell must be

$$F = \frac{T R}{n r}$$

There must also be a normal (radial) force N to make the existence of F possible.

Choosing point B as fulcrum, the condition of equilibrium for the roller demands that the algebraic sum of all moments be zero, i.e., that the resultant L of F and N must pass through point B.

Therefore, the normal force between shell and roller is

$$N = \frac{T R}{n r} \cot \left(\frac{a}{2} \right)$$

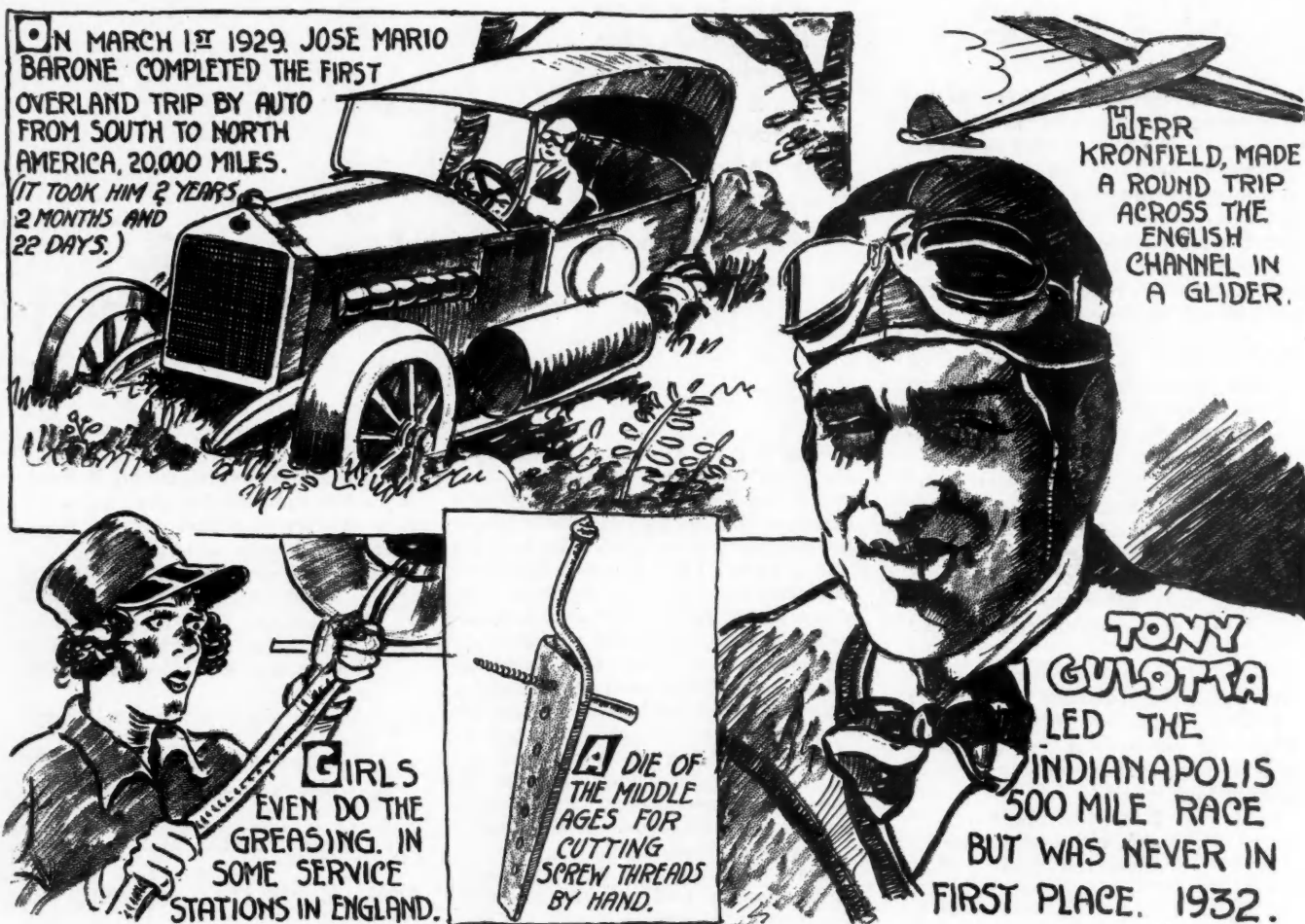
and the resultant load per roller

$$L = \frac{T R}{n r \sin \left(\frac{a}{2} \right)}$$

This gives for the Studebaker President model a load per roller of 10,927 lb., instead of 5942 lb., and load per inch of roller length of 14,569 lb., instead of 7923 lb. With a maximum safe load of 25,000 lb. per in., as given by S. O. White, the safety factor is only 1.72, instead of 3.15.

L. ZIMMERMANN.

Automotive Oddities—By Pete Keenan



Write us if you know an oddity

The NEWS TRAILER

Culled from statements this week: . . . "A vast reservoir of buying power is backed up behind public caution, ready to flood the United States with a new wave of prosperity, once it is released."—Roy D. Chapin, new Secretary of Commerce. . . . "There is more optimism than I have seen in almost two years."—J. W. Frazer, general sales manager Chrysler. . . . "We have had a sharp increase in calls for skilled tool makers and machinists during the past two weeks."—B. C. Seiple, State-City Employment Bureau, Cleveland. . . . "More than 43,000,000 people gainfully employed and 52,000,000 savings accounts, and normal buying habits will return soon."—Courtney Johnson, assistant sales manager, Buick-Olds-Pontiac. . . . "The depression has hit bottom, the curve is upward. . . . I fully expect the Willys-Overland factories will be running full tilt within a year."—John N. Willys.

Five Hupp distributors now bloom in New York City where only one grew heretofore.

Buffalo is just having a sweet little price war, and some of the independent cabs are soliciting fares "free of charge." They're relying entirely on tips for revenue.

Six months without a fatal motor accident is a record any city may be proud of, especially when it has about 170,000 inhabitants, like Grand Rapids, Mich. Every year for the last three has seen fewer automobile accidents there.

Every once in a while newspapers are now making reference to the automatic transmission which Bendix Aviation has under development. So far Bendix has not permitted us to say anything about it, but we are still hoping.

NEWS

Imperial Group Asks "Free Trade"

Move for Non-Tariff Basis for Automobiles Made at Ottawa

OTTAWA, Aug. 9—The Imperial Economic Conference today dealt with proposals for free trade in automobiles between British countries, particularly with respect to industries in Canada and Great Britain.

This is a step further than offered by Prime Minister Bennett of Canada to admit duty free British cars, parts and equipment into Canada.

This development is believed to be the outcome of a visit to Ottawa last week of representatives of Canadian Automobile Chamber of Commerce, following the news of Bennett offer when automobile manufacturers declared willing attitude toward free entry of British cars into Canada in exchange for other favors.

This is now understood to mean a request to Britain to admit Canadian cars duty free, and the conference is now working on this basis behind closed doors.

No concession is seen for American cars shipped through Canada. Canadian product must have 50 per cent Canadian content, and the content percentage is applicable against cars made in Britain.

Chevrolet Registers 33% of U. S. Totals

DETROIT, Aug. 6—Complete registration reports show that Chevrolet Motor Co. sold 215,811 cars for the first six months of 1931, equivalent to 32.9 per cent of total registrations, and comparing with 31 per cent for the same period in 1931, 24 per cent in 1930 and 20 per cent in 1929.

G. M. Declares Regular Dividends

NEW YORK, Aug. 10—Directors of General Motors Corp. at their meeting held last week declared on the outstanding common stock the regular quarterly dividend of 25c a share, pay-

able Sept. 12, 1932, to stockholders of record Aug. 13, 1932.

In addition to the regular quarterly dividend of \$1.25 a share was declared on the \$5 preferred stock, payable Nov. 1, 1932, to stockholders of record Oct. 10, 1932.

July Sales Off In 14 States

U. S. Total Will Reach 106,000, Early Returns Indicate

PHILADELPHIA, Aug. 11—Passenger car sales in July contracted sharply after maintaining an upward trend in May and June, according to returns from the first 14 states to report. These early reports indicate a total of about 106,000 for the month as compared with 152,000 in June and 194,322 in July, 1931.

On the basis of these estimates, July business was about 35 per cent of normal as compared with 52 per cent in June and 34 per cent in April, the low point of the current depression.

Apparently the spurt in May and June must be attributed entirely to the accumulation of Ford orders and now that this backlog has been absorbed, the future trend of car sales will depend largely on the tendencies exhibited by business generally.

In the 14 states which have reported, total sales are off 46 per cent from last year, Ford shows a loss of 9.3 per cent, Chevrolet is behind 57.4 per cent while Plymouth with a loss of 42 per cent failed to show a gain over the same month in the previous year for the first time since the introduction of floating power.

Maryland Gas Tax Income Shows Gain

BALTIMORE, Aug. 11—Gasoline tax paid in Maryland during July showed an increase of \$15,457 over the corresponding month of last year. The gross figure for this July was \$722,430.

The total for the first seven months of this year was \$4,382,101.74, as compared with \$4,095,990.50 during the corresponding period of last year.

Chapin Makes Hit With Press

Analysis of Business Seen by Writers to be Big Asset in Office

(Our Washington correspondent was one of the witnesses of Mr. Chapin's installation as Secretary of Commerce. His account of the event follows.—Editor.)

by L. W. Moffett

WASHINGTON, Aug. 11—The first automobile manufacturer ever to occupy a portfolio in the United States cabinet, Roy Dikeman Chapin, former chairman of the Hudson Motor Car Co., has already plunged into his work as Secretary of Commerce. Taking the oath of office last Monday, he granted a short interview to the press, was made acquainted with the personnel and workings of the Department by his predecessor, Robert Patterson Lamont, and on the second day he engaged in conferences bearing on the nation's business.

At his initial meeting with the press, Mr. Chapin was freely photographed and while he discussed business conditions in a general way, he assumed immediately the role of a government official whose capacity checks comment from elaboration to the point permitted a private citizen.

Mr. Chapin having been a prominent leader in the automotive industry was accustomed to press interviews and acquitted himself easily before the 50 correspondents who surrounded him and asked him innumerable questions seeking to get his views of the business outlook.

They were especially keen for his remarks both because of the improved sentiment which has set in simultaneously with his taking office and for the reputation Mr. Chapin has as an able analyst of economic conditions. He made a good impression on the press.

His forthright manner of discussion of matters which were "not for print" and his exchange of views with the correspondents lent a stimulating air (Turn to page 214, please)

G. M. Consolidates Sales, Service Section

DETROIT, Aug. 9—Consolidation of operations of two General Motors Corp. Central Organization divisions has been effected. With the formation of the Buick-Olds-Pontiac Sales Corp. much of the routine work relating to these companies, and formerly carried out by the Sales and Service sections of General Motors has been transferred to the new company.

As a result the service and sales sections have been combined into a "Sales and Service Section," under the direction of R. H. Grant, assisted by D. S. Eddins, formerly vice-president and general manager of Olds.

Tool Inquiries Cheer Steel Men

Automotive Demands For Machine Tool Requirements Brighten Mill Outlook

NEW YORK, Aug. 11—Although shrinkage in specifications from automotive consumers for all descriptions of finished steel is noted this week, inquiries for tool steel that can be directly traced to motor car manufacturers' machine tool requirements portend an early broadening of demand.

Anticipating a better run of orders from industries that have been out of the market for some time, skeleton operations were begun at a number of steel mills that had been down for some time, among these one of the large units of the leading producer.

This gain was offset, however, by the temporary shut-down of another unit. A prominent "independent" sheet mill that had been down for some time is operating six of its eight mills this week. All in all, the steel industry is still waiting for the effects of the general improvement in business sentiment.

The market is largely untested, prices holding fairly steady in the light transactions recorded. If Government loans make it possible for the railroads to come into the market on a large scale, this, together with the expected upturn in structural steel consumption, is quite likely to create the impression of the tide having turned in favor of sellers. This would naturally tend to stiffen the price of steel bars and semi-finished steel.

The market for sheets strip, etc., however, will continue to depend upon automotive consumption as its chief prop, and should respond more so to this influence than to any, even a startling rise in ingot output.

Pig Iron—Blast furnace interests look forward to a gain in releases during the second half of August. What business comes from automotive foundries is almost solely in single car lots. Prices are unchanged, but the tone of the market is a shade firmer.

Aluminum—The market is dull. Cleveland and Detroit remelters look for little improvement until 1933 models come into production. Prices remain the same.

Copper—Higher prices obtained for export copper have not been without effect on domestic prices. Where a fortnight ago a buyer could pick up all the copper he wanted at 5½ cents, delivered Connecticut Valley, he would now have to pay 5½ cents at the least, with more and more producers and custom smelters holding for 5½ cents.

Tin—Tin is selling approximately \$30 a ton higher than a month ago, Straits being quoted early this week at 22½ cents.

Lead—Further advances would not come as a surprise. Sellers were none too anxious to do business at the 3.10 cents, New York, price at which the market opened the week, the general feeling being that higher levels are in the offing.

Zinc—The statistical position of the metal is such that even a slight increase in consuming demand will affect its price which is now 2.75 cents, East St. Louis.

Chapin's Ability Impresses Press

(Continued from preceding page)

to the conference. It was in the nature of a "peppy" yet entirely sane talk which emphasized the aggressive character of Mr. Chapin.

Mr. Chapin would make no prophecy as to the prospects for business recovery in the early future but said he felt "very hopeful" over late developments.

When asked as an "automobile manufacturer" whether he considered American branch plants in Canada a "good thing" and whether he would assume a definite policy regarding them, Mr. Chapin spoke of the part branch plants are playing in connection with the British Imperial conference in Ottawa. He said he believed that if a large measure of success were experienced by Britain and her Dominions this country would undergo a loss in its foreign trade.

Mr. Lamont, after introducing Mr. Chapin, said he was sure every business man approved the President's choice in selecting Mr. Chapin, and assured Mr. Chapin he would receive the same loyal support which Mr. Lamont had received in the Department.

In reply Mr. Chapin said it meant much to him to be coming into an office with such a friendly atmosphere as that which he encountered.

Turning to Mr. Lamont, Mr. Chapin added:

"I am glad indeed to know that you are so convinced of the skill and inherent capacity of the organization. Probably at no previous moment in the history of the country could such a service prove to be useful as it can today. Naturally, like every other American, I am gratified at the unmistakably better tone in our industry and marts of trade.

"Concerning the future trend, I will not be so bold as to venture a prediction now—but one thing is very certain: We must all exert ourselves to the utmost, striving to strengthen all favorable factors and to make the inevitable, definite turn come as soon and with as much security as possible.

"The facilities of the Department of Commerce, designed solely to help business in all of its manifold aspects should prove a potent instrument in aiding an advance along the upward road."

Dalton is "Motor" Editor

NEW YORK, Aug. 8—James Dalton, formerly industrial editor of *Motor*, has been appointed editor of that automotive magazine, succeeding Ray Sherman, whose resignation was announced recently in *Automotive Industries*.

Mr. Dalton was formerly editor of *Automotive Industries*.

Truck, Bus Taxes \$293,000,000

Commercial Vehicles Paid 28½ Per Cent of All Motor Levies in 1931

NEW YORK, Aug. 10—Taxes paid by trucks and buses in 1931 totaled \$293,000,000—or more than 28½ per cent of the collections from all motor vehicles in the United States, the National Automobile Chamber of Commerce reports in its yearbook.

These commercial vehicles represented less than 13½ per cent of all vehicles in operation.

Gasoline taxes accounted for the biggest portion of the truck payments to state and local governments—amounting to approximately \$144,530,000. Registration fees for trucks approximated \$77,000,000 and the gas taxes and license fees paid on buses were \$31,775,000.

In addition, personal property assessments on rolling stock and special municipal tax claimed \$40,000,000 of the commercial vehicle operators' income.

Farmers Are Leading Motor Vehicle Users

Farm Cars and Trucks on Farms Number 5,035,060

NEW YORK, Aug. 10—Farmers are revealed as the country's largest single occupational class of motor vehicle owners, according to the annual statistical summary published recently by the National Automobile Chamber of Commerce.

Quoting statistics of the National Farm Census, the chamber points out that there are more motor vehicles on farms than telephones and radios combined.

The census disclosed that there are 4,134,675 passenger cars and 900,385 trucks owned on farms, whereas there are only 2,139,194 farms equipped with telephones.

The report on farm ownership of radios is incomplete, but figures from 27 states already indicate that they will not equal the number of telephones owned on farms.

In some agricultural states, more than half of all the trucks registered are owned on farms. In North and South Dakota 65 per cent of all trucks are in the farm-owned classification.

Bus Operators Fix Date for Meeting

National Association of Motor Bus Operators will hold its annual meeting in Chicago on Sept. 29 and 30, according to revised plans just announced. This meeting will follow directly the annual meeting of the American Electric Railway Association, now scheduled to be held Sept. 27 and 28, there.

Albert Strelow Dies; Early Ford Investor

**\$5,000 Stock Sold for \$25,000
Was Later Worth \$3,000,000**

DETROIT, Aug. 9—Albert Strelow, one of the original stockholders in the Ford Motor Co., died here early today.

After much hesitation Mr. Strelow invested \$5,000 in stock and in the first year realized 300 per cent on his investment, and soon sold his stock to Senator James Couzens for \$25,000. Had he held his stock a few years longer, it would have netted him more than \$3,000,000.

After selling his stock, Mr. Strelow went to the Canadian Northwest, invested his \$25,000 in mining stock and lost it. Returning to Detroit, he stood in line with thousands of men who sought employment at the Ford Highland Park plant. Later he became a building contractor.

DETROIT, Aug. 9—Albert Strelow, who died yesterday in his modest frame home, was one of the few persons who bought Ford stock for cash at its incorporation, the company's records show. Other 50-share buyers included John F. Dodge, Horace E. Dodge and Horace H. Rackham.

Reo Reports Loss

DETROIT, Aug. 10—Reo Motor Car Company reports net loss for second quarter ending June 30 of \$586,904.

Cash on hand in banks total nearly \$4,000,000 with better than \$1,500,000

in addition in government municipal and marketable securities.

Total current assets \$10,808,139 as against total current liabilities of \$878,472.

Frazer of Chrysler Cites More Activity

**Sales Head Is Optimistic
At Apparent Upturn**

DETROIT, Aug. 9—A marked increase in passenger car sales activity has been noted during the past two weeks, according to J. W. Frazer, general sales manager of Chrysler Sales Corp.

"I don't know what it is," Mr. Frazer says, "whether the better tone of the stock market, the upturn in commodity prices, the bumper crop situation or all of them, but during the last two weeks there has been a marked increase in activity all over. It isn't confined to any one section of the country either."

Mr. Frazer stated that in one day he had sold 165 Chrysler eights to distributors over the telephone during the last week, in spite of the fact that major interest still seems to be centered in the lowest priced group.

La Porte Joins Utica Heater

Ralph P. La Porte, formerly a member of the executive staff of the E. G. Budd Mfg. Co., Philadelphia, has been appointed manager of manufacture of the International Heater Co., Utica.

Goodrich Shows \$710,000 Loss

**First Half Shows
Heavy Write Down
Upon Raw Materials**

AKRON, Aug. 10—The B. F. Goodrich Co. reported today a loss of \$710,000 for the first six months of this year after a heavy write down of raw materials.

Company operations netted a profit of \$1,002,000 for the six months, directors announced, but shrinkage in the value of rubber and cotton on hand and on commitment amounted to \$1,733,000.

The \$710,000 loss compares with a loss of \$288,000 for the same period of 1931. Net sales of the company during the first six months of this year amounted to \$47,183,000 compared with \$59,878,000 for the same period last year, a decrease of 21 per cent.

Unit sales of tires showed an increase, although lower prices resulted in the decrease in dollar sales, the report showed.

Current assets of the company on June 30 amounted to \$64,626,000 including \$14,567,000 in cash and marketable securities, directors said, and current liabilities are \$6,515,000.

Ford is Shut Down Until Labor Day

**Reports of Larger 8 and
Smaller 4 Are Current**

DETROIT, Aug. 10—Ford Motor Co. will shut down beginning Friday, Aug. 12, according to reports from usually reliable sources. The shutdown will be taken advantage of for the taking of inventory and factory and office vacations.

It is not expected that the Rouge plant generally will reopen before Labor Day in all departments.

A possibility is forecast also that Ford may take advantage of this shutdown to provide manufacturing facilities for an extension of the passenger car line.

Two reports are current at present, one indicating a car with longer wheelbase in a slightly higher price bracket with the eight-cylinder engine and the other a smaller edition of the present four at lower prices.

Registration reports for July received so far show that the eight is outselling the four approximately two to one, a fact which would seem to lend credence to both reports.

Jones Heads Engineering of Motor Wheel Heater

DETROIT, Aug. 10—Don F. Jones has been appointed chief engineer, heater division of Motor Wheel Corp. He was recently plant engineer of the wheel division and formerly with Prudden Wheel Company.

Production of Diesel and Semi-Diesel Engines in U. S. During 1931

WASHINGTON, D. C., Aug. 10—The statement below, giving statistics on the production of Diesel and semi-Diesel engines in 1931, compiled from

data collected at the biennial census of manufactures taken in 1932, is released by the Bureau of the Census. These figures are preliminary:

	Number of establishments reporting	Total			Number, by horsepower capacity (rated or normal, not overload)									
		Number	Rated horsepower capacity	Value	5 or more under 10	10 or more under 20	20 or more under 30	30 or more under 100	100 or more under 200	200 or more under 400	400 or more under 1,000	1,000 or more but under 5,000		
Total:														
1931.....	42	1,504	307,262	\$13,407,781	66	116	298	288	325	197	148	66		
1929.....	42	3,588	485,327	26,596,390	*131	165	975	969		1,311		37		
1931 Diesel (compression-ignition), total.....	134	1,318	291,603	12,877,179	48	61	224	272	315	196	142	60		
Marine (for direct connection to propeller shaft).....	23	559	101,613	4,768,628	1	12	142	105	159	74	58	8		
Other types of compression-ignition engines.....	22	759	189,990	8,108,551	47	49	82	167	156	122	84	52		
Semi-Diesel (surface-ignition).....	8	186	15,659	530,602	18	55	74	16	10	1	6	6		

* For 1931, no Diesel or semi-Diesel engines rated at less than 5 horsepower were reported; for 1929, 4 such engines were reported, and their number is included in the item for that year.

† No Diesel or semi-Diesel engines rated at 5000 horsepower or more were reported for either 1931 or 1929.

‡ The difference between the net total number of plants engaged in the manufacture of Diesel engines, 34, and the sum of the numbers engaged in the manufacture of marine engines and other types, 45, is due to the fact that 11 plants made both marine and other types of engines.

G.M. July Sales Reach 32,849

Drop From 56,987 in June and 85,054 for July of Last Year

NEW YORK, Aug. 8—July sales of General Motors cars to consumers in the United States totaled 32,849 as against 56,987 in June and 85,054 in July a year ago.

July sales of General Motors cars to dealers in the United States totaled 31,096 as against 46,148 in June and 78,723 in July a year ago.

July sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totaled 36,872 as against 52,561 in June and 87,449 in July a year ago.

Below is a tabulation of General Motors monthly sales for 1929, 1930, 1931 and 1932 to date. The figures are segregated to show: (1) Sales of General Motors cars to consumers in the United States; (2) sales of General Motors cars to dealers in the United States, and (3) total sales of General Motors cars to dealers in the United States and Canada plus overseas shipments.

Sales to Consumers in United States				
	1932	1931	1930	1929
January	47,942	61,566	74,167	73,989
February	46,855	68,976	88,742	110,148
March	48,717	101,339	123,781	166,942
April	81,573	135,663	142,004	173,201
May	63,500	122,717	131,817	169,034
June	56,987	103,303	97,318	154,437
July	31,096	78,723	70,716	157,111
August		69,876	86,426	151,722
Sept.		51,740	75,805	124,723
October		49,042	57,757	114,408
Nov.		23,716	48,155	39,745
Dec.		53,588	57,989	44,216
Total		937,537	1,057,710	1,498,792

Sales to Dealers in United States				
	1932	1931	1930	1929
January	65,382	76,681	94,458	95,441
February	52,539	80,373	110,904	141,222
March	48,383	98,943	118,081	176,510
April	69,029	132,629	132,365	176,634
May	60,270	136,778	136,169	175,873
June	46,148	100,270	87,595	163,704
July	31,096	78,723	70,176	157,111
August		62,667	76,140	147,351
Sept.		47,895	69,901	127,220
October		21,305	22,924	98,559
Nov.		23,716	48,155	39,745
Dec.		68,650	68,252	36,482
Total		928,630	1,035,660	1,535,852

Total Sales to Dealers in United States and Canada Plus Overseas Shipments				
	1932	1931	1930	1929
January	74,710	89,349	106,509	127,580
February	62,850	96,003	126,196	175,148
March	59,696	119,195	135,930	220,391
April	78,359	154,252	150,661	227,718
May	66,739	153,730	147,483	220,277
June	52,561	111,668	97,440	200,754
July	36,872	87,449	79,976	189,428
August		70,078	85,610	168,185
Sept.		58,122	78,792	146,483
October		25,975	28,253	122,104
Nov.		29,359	57,257	60,977
Dec.		79,529	80,008	40,222
Total		1,074,709	1,174,115	1,899,267

Unit sales of Chevrolet, Pontiac, Oldsmobile, Buick, LaSalle and Cadillac passenger and commercial cars are included in the above figures.

Ford Adopts New Axle Ratio: 4.1-1

PHILADELPHIA, Aug. 10—Ford Motor Car Co. recently adopted a new axle reduction for the eight-cylinder car, it is reported.

The new axle ratio of 4.1 to 1 compares with 4.33 to 1 formerly used and while reducing accelerative ability should be reflected in still higher top speed for the V-8.

The change is also effective in reducing torque strains on axle shafts, etc.

Two Firms Start Work In Akron

Rubber Factory and Steel Castings Plant Open

AKRON, Aug. 10—Two new manufacturing companies have been organized here to begin operation early this month. The Advance Rubber Co., organized last week, has taken over part of the old Amazon Rubber plant and will manufacture parts for storage batteries, automotive and electrical equipment and specialties. F. R. Jefferys, S. Hershberger and V. L. Mears, former executives of the Aetna Rubber Co., Ashtabula, head the new company as president, treasurer and vice-president, respectively.

Akron Supersteel Castings, Inc., will have its new plant in operation Aug. 10, employing 40 men immediately and 300 men when expansion is completed, officials announced this week. C. F. Adamson, president of the Adamson Machine Co. of Akron, is president of the new company. The new concern will specialize in open-hearth carbon and alloy steel castings.

Australian Petroleum Imports Show Drop

SYDNEY (Special)—Imports of petroleum products into Australia decreased greatly during the last half of the year 1931, as compared with the last half of 1930.

Imports of gasoline decreased in value from £2,782,517 to £1,258,612; imports of mineral oils from £464,881 to £241,456; and imports of kerosene from £488,877 to £202,581.

Mullins Reports Orders

SALEM, OHIO, Aug. 9—Automotive orders totaling between \$600,000 and \$700,000 have been received by the Mullins Mfg. Corp., and within 60 days they are expected to have a decided influence upon general employment at the plants.

More than 50 men have been added to the working forces in the various departments.

Curtiss-Wright Shows Net Loss of \$269,655

Corporation and Subsidiaries Off, Compared with Previous Quarter

Curtiss-Wright Corp. and subsidiary companies report, for the quarter ended June 30, a consolidated net loss of \$269,655 after depreciation, interest and taxes as compared with a net profit of \$302,013 for the quarter ended March 31, and with a net loss for the quarter ended June 30, 1931, of \$375,030.

For the six months ended June 30, 1932, net profit was \$32,358 after above charges, as compared with net loss of \$1,463,154 in the first six months of 1931.

Wright Reports Net Profit of \$31,866

Wright Aeronautical Corp. reports for the quarter ended June 30, a net profit of \$31,866 after depreciation, interest and taxes, as compared with a net profit of \$334,724 for the quarter ended March 31 and with a net profit of \$39,575 for the quarter ended June 30, 1931.

For the six months ended June 30, net profit was \$366,590 after above charges, as compared with a net loss of \$317,283 in the first quarter of 1931.

Curtiss Aeroplane Shows Net Loss

Curtiss Aeroplane & Motor Co., Inc., reports for the quarter ended June 30, 1932, a net loss of \$109,335 after depreciation, interest and taxes, as compared with a net profit of \$96,700 for the quarter ended March 31, 1932, and with a net profit for the quarter ended June 30, 1931, of \$80,060. For the six months ended June 30, 1932, net loss was \$12,635 after above charges, as compared with a net profit of \$33,545 in the first six months of 1931.

Timken Roller Net Earnings \$417,521

CANTON, Aug. 9—Net earnings of the Timken Roller Bearing Co. and its subsidiaries for the first six months ended June 30 were \$417,520.68, after charges and provision for Federal tax has been deducted.

At a board meeting, a cash dividend of 25 cents per share was declared payable Sept. 6, to stockholders of record at the close of business, August 19, 1932. It was also decided to cut the dividend rate from \$1.50 to a \$1 basis for the year.

Essex Engine Lubrication

The new Essex Terraplane model, described in *Automotive Industries*, July 23, carries the same engine lubrication system, known as a semi-splash system, that has been used on Hudson and Essex cars in the past.

The statement that the engine is lubricated by the pressure system was therefore incorrect.

Synthetic Oil Made From Wax

Standard Oil Lubricant
Developed From Paraffin
Now in Service Stations

CHICAGO, Aug. 8—Standard Oil Co. (Indiana) has begun to market in a limited way the new synthetic lubricating oil, of which an announcement was made at a meeting of the American Chemical Society more than a year ago.

The oil is known as Syntholube and is supplied to greasing stations in drums selling at \$10 each, which is said to be equivalent to 50 cents a quart. These greasing stations will fill crankcases from the drums and before doing so will drain off all other oil from the crankcase.

An especially interesting fact about the synthetic oil is that it is made from paraffin wax, an element of crude petroleum that oil companies have spent millions of dollars to find ways of removing from ordinary motor oils.

The paraffin is not a constituent of the new product, however, but the raw material from which the synthetic oil is manufactured. In the process, the paraffin molecules are broken up and rebuilt to make particular kinds of hydrocarbons that research is said to have demonstrated to possess lubricating properties in a superlative degree.

The unusual qualities claimed for the oil are that it undergoes relatively little change of body with changes of temperature (it will still pour or flow through the pump at temperatures of 20 to 25 deg. below zero), that it has exceptionally low carbon-forming tendencies, and that it will not oxidize and deposit sludge even under the most severe conditions.

If it could be kept free from road dirt, there would be practically no need of ever renewing or changing this oil, its originators claim. It is an all-year oil, suitable for use in either summer or winter.

In combination of unusual characteristics, the synthetic oil, they assert, is in a class over and above other motor oils so far produced.

In marketing they will depend on these unusual qualities to sell the oil regardless of the relatively high price.

Twin Coach Had Best Year in 1931

KENT, OHIO, Aug. 9—Twin Coach officials have announced that the year 1931 was the most prosperous year since organization of the company. The first half of the year 1932 does not equal that of the year before, although the business has not been affected as badly as many other concerns.

The customary dividend of \$2 on preferred stock has been paid to stock-

holders. Last year the capitalization of Twin Coach included \$1,040,000 and eight per cent cumulative preferred stock and 210,000 shares of no par common stock.

Colin Campbell



Colin Campbell, 1885-1932

One of the most colorful figures in the automobile industry and successively sales head of Chevrolet, Star, Flint and Willys-Overland, Colin Campbell, died Aug. 2 in Detroit after a prolonged illness. He retired as vice-president of Willys-Overland in 1929, following a breakdown.

After 19 years of railroading he joined W. C. Durant in 1916 and in 1921 was made sales manager of Chevrolet. During his first full year in charge, Mr. Campbell increased the Chevrolet sales from 77,000 units to 242,000 cars and in 1923 raised the total to 483,000.

In 1924 he resigned from Chevrolet with the intention of retiring. Mr. Durant interested him in the Star and Flint properties, however, and he joined the Durant organization almost immediately.

Two years of brilliant sales management, and Mr. Campbell again retired, but was induced to join Willys-Overland as vice-president in charge of sales in 1928.

Japan Imports Show Decrease

TOKIO (Special)—Imports of automobiles and parts into Japan decreased from 33,608,383 yen in 1929 to 20,773,730 yen in 1930, to 16,329,168 yen in 1931 (one yen equals about 27 cents at current rates of exchange). About 98 per cent of the Japanese imports of automobiles and parts originate in the United States.

The Japanese Government is reported to be planning, as part of its general industrialization scheme, the creation of an automobile industry. An advisory committee recently held a meeting and recommended that a bonus of 4000 yen should be paid per vehicle to the manufacturers who produced the first commercial vehicles of Japanese manufacture throughout.

The conclusion indicates clearly the position of the government in the enterprise.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
Automotive Industries

NEW YORK, Aug. 11—There has not been much change in the actual level of business activity, but the general attitude in trade quarters is decidedly better.

The strengthening of commodity and security markets is regarded as one of the most encouraging factors in months.

MODERATE IMPROVEMENT SEEN

Here and there a moderate improvement is noted in a few industries. Retailers have been attempting to dispose of the remainder of their stocks of summer goods by special sales, but fall buying has not been heavy.

FREIGHT LOADINGS DOWN

Railway freight loadings during the week ended July 23 totaled 501,130 cars, which marks a decrease of 2964 cars below those during the preceding week, a decrease of 241,351 cars below those a year ago, and a decrease of 418,171 cars below those two years ago.

ELECTRIC POWER OFF

Production of electricity by the electric light and power industry of the United States during the week ended July 30 was 12.4 per cent below that a year ago.

COST OF LIVING LOWER

The cost of living during June, according to the Bureau of Labor Statistics, was 6.9 per cent below that last December and 9.7 per cent below that a year ago.

FARM PRICE INDEX DOWN

The index of the general level of farm prices on July 15 stood at 57 per cent of the pre-war average, as compared with 79 per cent a year ago.

CRUDE OIL PRODUCTION

Average daily crude oil production for the week ended July 30 amounted to 2,137,500 bbl., as against 2,205,850 bbl. for the preceding week and 2,500,650 bbl. a year ago.

FISHER'S INDEX UP

Professor Fisher's index of wholesale commodity prices during the week ended Aug. 6 stood at 61.1 as against 60.9 the week before and 60.8 two weeks before.

BANK DEBITS DOWN

Bank debits to individual accounts outside of New York City during the week ended Aug. 3 were 29 per cent below those a year ago.

STOCK MARKET STRONGER

There was a sharp recovery of prices on the stock market last week. A considerable amount of liquidation occurred as prices rose, but it was well absorbed.

The volume of trading was large, reaching 3,521,030 shares on Thursday. There was a large amount of buying to cover short accounts, which had a stimulating effect on prices; but much of the buying was of an investment nature.

RESERVE BANK STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Aug. 3 showed increases of \$1,000,000 in holdings of bills bought in the open market and of \$5,000,000 in holdings of Government securities.

Holdings of discounted bills decreased \$38,000,000. The reserve ratio on Aug. 3 was 57.2 per cent, as against 56.5 a week earlier and 56.2 two weeks earlier.

Franklin Offers New "Double-high" Axle

Twelve Models Now Have 5.1 and 3.4 to 1 Ratios

SYRACUSE, Aug. 7—A "double-high" rear axle is now being offered optionally by the Franklin Automobile Co. on its 12-cylinder model. This gives a rear axle ratio of 5.1 to 1 for use in city driving and in hilly country, and a ratio of 3.4 to 1 for fast traveling on fairly level roads.

The high ratio makes it possible to accelerate very rapidly and to climb steep hills without changing gear, while the low ratio keeps down engine speed and car vibration at high car speeds.

The change from one reduction ratio to the other is made by flipping a control lever on the dash. A small extra charge is made for the optional equipment.

Killinger Optimistic of Willys-Morrow Co.

MANSFIELD, Aug. 6—Clarence E. Killinger, president and general manager of Willys-Morrow plant, Elmira, N. Y., returned from Toledo after a week's conference with John N. Willys, after which he said:

"Future of the Willys-Morrow Co. depends upon the success of the Willys-Overland automobile. The removal of the Elmira plants equipment to Toledo has been abandoned after being seriously considered for several months. The Elmira unit will be the only plant from which transmissions will be supplied, giving way to the old system of having them manufactured in several cities. Other parts will be made in Elmira."

A force of 200 is now working, and will be increased gradually. Hundreds of men will soon resume their old places on a five-day week in due time.

It is expected expense of new machinery to be installed will be about \$100,000. It is being thought in Elmira that Willys will place a new type of car on the market. This is unofficial.

Houdaille Shows \$99,987 Net Loss

DETROIT, Aug. 10—Houdaille-Hershey has reported for first six months of 1932 a consolidated net loss of \$99,987 after all charges, but before dividend requirements amounting to \$60,000 on the Class A stock of its subsidiary, Muskegon Motor Specialties.

This compares with net profit in the first half of 1931 of \$669,296.

George S. Hale

The body of George S. Hale, late general superintendent of the Ford Motor Co. of Canada, Ltd., Montreal plant, who disappeared on July 10 while on a fishing trip in the Laurentian moun-

tains, near L'Ascension, was found Aug. 2 in Ten Mile Creek.

He had been identified with the Ford company since 1914 occupying various positions of trust and had been superintendent of the Montreal branch plant since 1926.

Mr. Hale is survived by his widow, three sons and two daughters, his mother, also one brother and sister. He was well known in Masonic circles in Toronto, Ont.

Commercial Credit Net Exceeds Dividend Needs

Consolidated Operations First Six Months Show 79 Cents Per Annum Rate on Common

BALTIMORE, Aug. 10—Consolidated operations of Commercial Credit Co. and subsidiaries for the six months ended June 30 show net income of \$1,348,970.96.

After payment of all dividends on preferred and preference shares, this was at the annual rate of 79 cents per share on the outstanding common stock. This compares with net income of \$2,075,188.24 for the same period of 1931, which was at the annual rate of \$2.03 per share on the common stock.

Interest and discount charges were earned 1.91 times as compared with 2.20 times for the same period of 1931. Dividends on the company's 6½ and 7 per cent first preferred stocks were earned 3.44 times, and on the Class A \$3 convertible stock 2.16 times as compared with 4.89 times and 3.68 times, respectively, for 1931.

Operating expenses other than interest were at a lower ratio on average money employed than for the corresponding period of 1931, although the average money employed was substantially less.

Mass Heads Acme Sales in Detroit

B. L. Mass, formerly secretary and sales manager of Federal Screw Works, is now connected with the Acme Machine Products Co. of Muncie, Ind., with offices in Fisher Building, Detroit.

He will have complete supervision of sales for this company.

Hudson Shipments Highest in Year

Six Months Total Reaches 4261 Units

DETROIT, Aug. 10—Shipments of automobiles from the Hudson Motor Car Co. during the last half of July totaled 4261 cars, it is reported here. This is the largest number shipped for any similar period for more than a year. Shipments during Terraplane announcement week, ending July 23, totaled 2711 cars, the biggest week since last May, when in the last week of that month 3010 cars were shipped.

Sees Ford Caught Up With Orders

Wayne Registrations Indicate Demands Off for New Jobs

DETROIT, Aug. 10—Wayne County registrations for July serve as a further indication that Ford definitely has caught up with orders and that the demand has fallen off. Ford July registrations of 2161 were approximately half those for June. The trend to favor the eight over the four continues with sales in a proportion of more than two to one.

Total July sales represented a decrease of 46 per cent from June and 21 per cent under last July. Chevrolet and Plymouth hold second and third place. Essex moved into fourth during the last week when the Terraplanes began to be available for delivery, making Essex the only car to show sales gain over June.

Decreased sales of Ford trucks were largely accountable for large falling off in Wayne truck sales. These were 58 per cent under June and 44 per cent under last July.

Nestle Heads Buick Retail in Detroit

Harvey Nestle has been appointed service manager of the Buick retail store, at Cass Ave. and Amsterdam, according to a recent announcement by the Buick Motor Company.

Mr. Nestle has been special representative for the Buick-Olds-Pontiac Sales Co. and prior to that was sales representative for Olds Motor Works in Cleveland. In 1927 he was appointed regional service manager for Olds, and previous to that was service manager of the company in Philadelphia and Cleveland.

Hupp to Use Five Distributors in N. Y.

DETROIT, Aug. 6—According to an announcement by R. S. Cole, vice-president in charge of sales, Hupp Motor Car Co. is changing from a single distributor set-up in New York, to a plan including five individual distributors located respectively in Manhattan, Queens, the Bronx, White Plains and Newburgh. Operating under these five distributors are 65 dealers.

Kroha Joins Fitzsimons

Lawrence J. Kroha, for the past six years sales manager of Harry Brothers Stamping Co., joined the Fitzsimons Mfg. Co., and will handle sales of the company's stamped metal products.

Graham Using Parcolite

DETROIT, Aug. 10—Graham-Paige Motors Corp. has announced that Parcolite rustproofing process is being used in the treatment of all bodies,

Motor Men Give Air Race Prizes

Bendix, Thompson, Cord and Others Spur New Events With Big Awards

CLEVELAND, Aug. 8—Individual sponsors of special events, representing numerous divisions of the automotive industry, will play an even greater part than ever before in the National Air Races to be held here Aug. 27 to Sept. 5, according to Clifford W. Henderson, managing director of the races.

Heading the list in importance are the Bendix transcontinental dash and the Thompson Trophy race. Vincent Bendix has posted \$17,500 for the race from the West Coast to Cleveland and Cleveland to New York.

Of this amount, \$15,000 will be awarded for the dash to Cleveland, and the additional sum of \$2,500 will go to a flier who continues to New York to set a new transcontinental record, as did Major James Doolittle last year.

The Charles E. Thompson trophy and \$10,000 in cash will be at stake in the world speed classic for men on a closed course. The Cleveland Pneumatic Aerol Trophy race, corresponding feature for women, is to be repeated this year.

Other sponsored events will be the Frank R. Phillips race for the Woolaroc trophy and \$2,500; the William B. Leeds race from New York to Cleveland, with \$2,000 in prize money; and the Amelia Earhart Putnam race for women, with an automobile and a trophy at stake.

E. L. Cord is sponsor for a transcontinental derby flight with a purse of \$10,000 and two automobiles as additional prizes.

Two memorial events are on the program. For the best speed in a qualifying straightaway trial the Springfield, Mass., chapter of the National Aeronautical Association has put up a trophy in memory of Lowell R. Bayles, Springfield flier, who piloted a Granville Brothers ship to win the Thompson trophy race last year, shortly before he was killed in a speed test at Detroit.

For this event \$5,000 in prizes will be awarded by the Shell Petroleum Corp., to be divided \$3,500 for men and \$1,500 for women.

The other memorial is a race dedicated to the memory of Edward A. Stinson, in which only Stinson ships will participate. Five hundred dollars in prizes will be awarded.

W. S. Graves

Word has been received of the death on Aug. 1 of W. S. Graves, former truck sales manager, Dodge Brothers Corp., at the home of his mother in Minneapolis, Minn.

Mr. Graves, who had been in poor health for some time, was on his way

to California as special company representative and had stopped to visit his mother in Philadelphia when he was stricken with a heart attack.

Brother is Vice-President of Campbell-Ewald Co.

D. P. Brother has been appointed vice-president and a member of the executive committee of the Campbell-Ewald Co.

Mr. Brother recently resigned as director of advertising for General Motors Corp., which position he has held for the past two years.

He became affiliated with General Motors in 1919. Later he was appointed assistant sales manager of the tractor and implement division of the Hyatt Roller Bearing Co.

In July, 1927, he became a member of the General Motors sales section and in June, 1930, when the advertising section of the corporation was formed, he was appointed director.

Lewis is New G. M. Advertising Head

DETROIT, Aug. 2—W. W. Lewis, formerly assistant director of advertising section, General Motors Corp., has been appointed director of advertising, succeeding D. P. Brother resigned.

Commercial Car Accident Rate Lower in 1931

CHICAGO, Aug. 10—The commercial vehicle accident rate was lower in 1931 than 1930, according to compilations just completed by the National Safety Council. Analysis of the accident experience of 151 fleets revealed that the rate per 100,000 vehicle miles in 1930 was 6.64 against 5.84 in 1931.

The Council's 1932 report is more comprehensive than ever before and should serve a very valuable statistical purpose next year. The report this year is based on replies from 555 fleets, operating over 35,000 vehicles in almost all vocations, but comparisons are not available because 75 per cent reported for the first time. However, the analysis without comparison is interesting:

In 499 fleets of all types, operating 33,000 vehicles, there were, during 1931, 5.08 accidents per 100,000 vehicle miles. These fleets covered about 443,000,000 miles during the year. Horse-drawn vehicles had the highest rate, 14.35, and commercially used passenger cars the lowest, 1.67.

Among the truck groups, which averaged 5.65 accidents per 100,000 vehicle miles, fleets operated by manufacturing establishments had the lowest rate, 2.98, and ice and coal companies the highest, 9.40.

Tables show the rate in three size classification and in almost all the vocations.

Goodyear Defends Mail Order Policy

Holds All Four Major Tire Concerns in "Chain" Business

AKRON, OHIO, Aug. 10—Goodyear Tire & Rubber Co. issued statements this week through its publicity department defending Goodyear's mail order tire manufacturing business, recently attacked by competitors and by a tire trade magazine.

The Goodyear statement signed by C. C. Slusser, vice-president and factory manager, charged that all of the four larger rubber companies of America are making tires for mail order houses or chain stores and have been in active competition for such business.

United States Rubber Co. makes tires for Montgomery Ward & Co., Goodrich makes tires for Standard Oil Co. stations, and Goodyear makes the tires for Sears, Roebuck & Co., the statement announced.

"The largest number of chain stores is that of Firestone, whose stores outnumber Sears' stores almost two to one," the statement continued. "When India Rubber & Tire Review crusades against Goodyear and Sears as the sole evils of the tire industry it is sending out a smoke screen of some kind."

The statement announced that Goodyear is making money out of its contract with Sears Roebuck.

The magazine article, published in the current issue, sharply criticized Goodyear for permitting the Sears advertisements of superiority in tire values to go unchallenged.

Beecher is Gabriel's New Chief Engineer

CLEVELAND, Aug. 8—Eugene L. Beecher, research engineer of the Gabriel Co., has been appointed chief engineer.

Beecher has been closely associated with the development of the automatic-thermostatic Gabriel hydraulic shock absorbers.

Formerly, while associated with Westinghouse, he aided with the development of the air spring and brake.

Sterling Offers Biseal Valve Cap

BUFFALO, N. Y., August 10—The Sterling Automotive Products Corp., manufacturer of the Twin-Seal automotive cap valve, has just placed on the market a lower-priced valve known as the Biseal.

This is claimed to afford the same automatic protection against loss of air and the advantage of permitting testing and inflation without removing, as does the Twin-Seal.

It is said to save four operations every time a tire is inflated or tested.

European Branch Opened by Permite

Establishment of an European branch at Antwerp, Belgium, for distribution of Permite Products is announced by President John Eckerle and Vice-President and General Manager H. J. Hater, of Aluminum Industries, Inc. The new branch is being operated by Corneliussen and Stakgold, A. V., which firm for all practical purposes constitutes the Aluminum Industries organization in Europe.

Negotiations in connection with the Antwerp branch which have been pending for more than two months have been completed and service will be started in the near future. Corneliussen and Stakgold is one of the best known firms in Europe and will have direct representatives of Permite not only throughout European but Scandinavian and Balkan countries as well.

Full stock of Permite aluminum alloy and semi-steel pistons, valves, pins, rings, bolts, water pump parts and mufflers, has been shipped from the Cincinnati and St. Cloud factories to Antwerp for overseas distribution.

Chrysler Frame Order to Midland

CLEVELAND—Midland Steel Products Co. has received a contract from Chrysler Motors to supply frames for the company, according to a report here as the financial statement of Midland was made public. The contract covered materials costing approximately \$5,000,000, according to the rumor, but officials of the company refused to comment.

The Midland company had a loss of \$135,950 for the second quarter, compared with a loss of \$139,135 in the previous quarter and a profit of \$431,653 in the second quarter of 1931.

Graham Reports \$249,797 Loss

DETROIT, Aug. 10—Graham-Paige Motors Corp. has reported net loss of \$249,797 after interest, depreciation, etc., for six months ended June 30, compared with net loss of \$833,056 for the same period last year.

Leather Option on Ford Cabriolet

Leather upholstery is now being offered as optional equipment on the cabriolet model of the Ford V-8, the other options being mohair and whipcord.

Hawker in De Vaux Service

H. J. Hudson, parts and service manager Continental De Vaux Co., announces the addition of Gordon E. Hawker to the field service, traveling staff of Continental De Vaux Corp.

One-Fifth of Auto Drivers Are Women

HARRISBURG, Aug. 10—The Bureau of Motor Vehicles of Pennsylvania estimates that approximately 378,760 or 20 per cent of the state's motor vehicle operators are women. When the estimate was made, 1,893,800 licenses had been issued. Male operators totaled 1,515,040.

The Bureau of Highway Patrol and Safety reports 30,835 operators involved in accidents in the first six months of the year. Of that number 28,642 were males, or 1.9 per cent of the male operators. Feminine operators reported 2213 accidents, or 0.6 per cent of the operators of that sex.

In fairness to the men, the bureau pointed out that they probably operate more hours than the opposite sex. Women drivers are increasing each year.

Old Dodge is First in Gold Rush Race

STOCKTON, CALIF., Aug. 9—Louis B. Miller, nationally famous cross-country driver, piloting "Stockton's Old Reliable," a 1915 model Dodge, finished first with a perfect score of 1000 points in the Auto Marathon opening the 83rd Annual Gold Rush celebration at Reno, Nev.

The Stockton Dodge was required by A.A.A. Contest Board regulations to start from Oakland, Calif., at sea level. The 254-mile trip to Reno was made in 5 hr. 50 min., an average of 43.56 m.p.h. Miller was driving under the colors of E. Allen Test, pioneer Dodge dealer in Stockton. The veteran Dodge car was sold by Test in 1915 and used by a resident of San Joaquin County until a short time ago. Miller's car, one of 34 entrants in the handicap, started last.

Garlock Goes After Replacement Sales

Garlock Packing Co., Palmyra, N. Y., has entered the replacement field for the first time with a line of packing rings and spool packing for automobile water pumps as well as several specialties.

Distribution will be handled through organized jobbers by the 21 branches of the Garlock Co. in the United States and through its six branches in Canada. Garlock's automotive products division will be under the direction of Ford Wilders, according to George L. Abbott, president.

Arthur J. Hayes

Arthur J. Hayes, managing director of the Champion Spark Plug Co. of Canada, Ltd., Windsor, Ont., died in the Ottawa General Hospital Saturday morning, July 30. Mr. Hayes, who was in the Canadian capital on business, was apparently in excellent health until a few hours before he was stricken with a heart attack. He was 49 years old.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

London, Olympia ShowOct. 13-22
Glasgow, Scottish Motor Show...Nov. 11-19
Paris, Aeronautical Show...Nov. 18-Dec. 4

CONVENTIONS

American Chemical Society, Denver, Colo.Aug. 22-26
S.A.E. Aircraft Meeting, ClevelandAug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, Ohio (Machine shop practice meeting)Sept. 12-17
American Trade Association Executives, Atlantic City (Annual)Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa.Sept. 19-20
Natl. Assoc. of Motor Bus Operators, ChicagoSept. 22-23
American Electric Railway Assn., Chicago, Ill.Sept. 27-28
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, TexasSept. 30-Oct. 1
S.A.E. Production Meeting, BuffaloOct. 3
Amer. Society for Steel Treating, BuffaloOctober 3
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y.Oct. 3-6

National Safety Council, Washington, D. C.Oct. 3-7
American Welding Society, Buffalo, N. Y.Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting).....Oct. 3-8
S. A. E. Annual Transportation Meeting, TorontoOct. 4-6
American Gas Association, Atlantic City (Annual)Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J.Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga.Nov. 14-16
American Society Mechanical Engineers, New York City (Annual Meeting)Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New YorkDec. 5-10
Highway & Building Congress, DetroitJan. 16-23

RACES

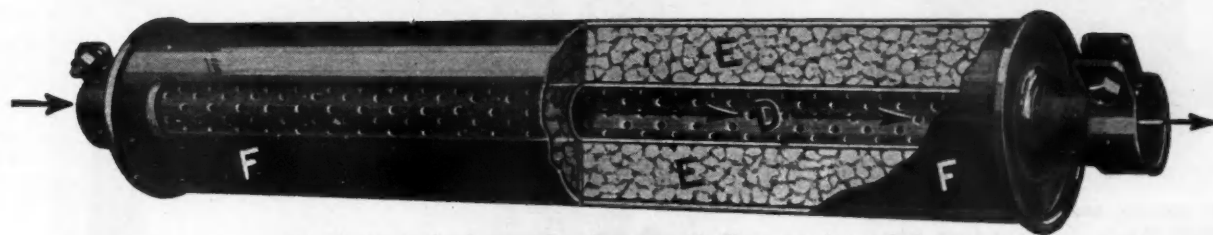
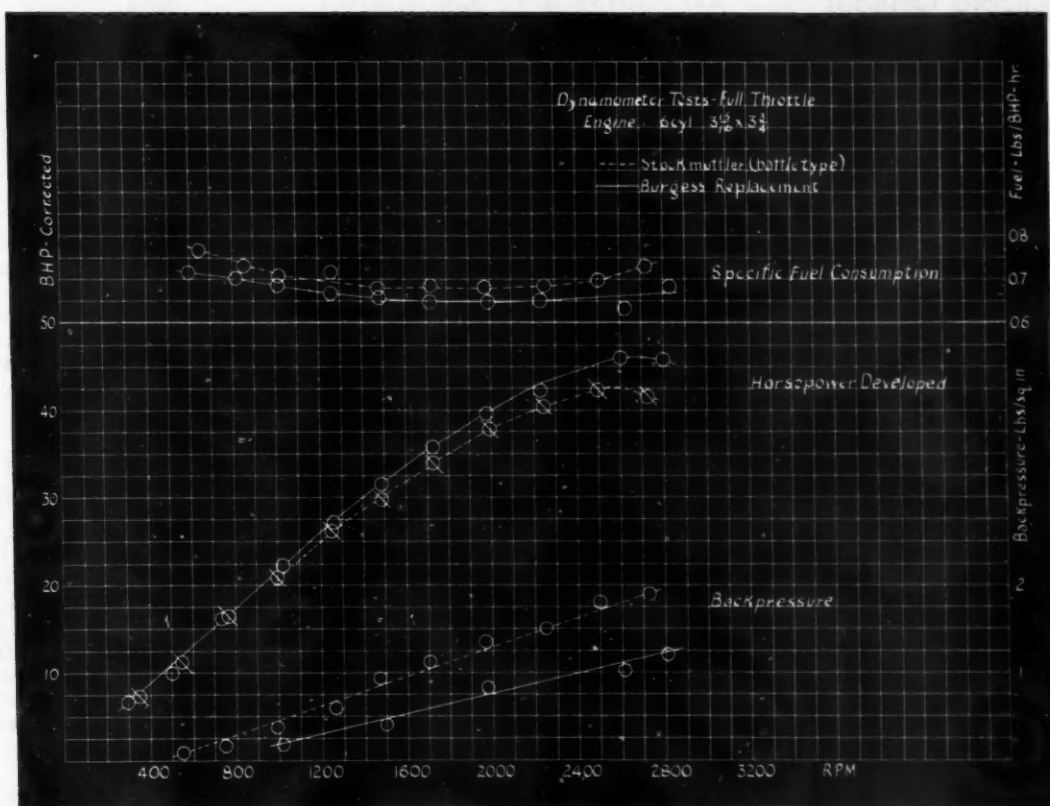
National Air Races, ClevelandAug. 27-Sept. 5
AltoonaSept. 5

There is a Difference— between BAFFLE MUFFLERS AND BURGESS MUFFLERS

This chart proves conclusively the advantages of Burgess Mufflers. Study it carefully. With Burgess Mufflers the burned-out gases pass straight through the muffler as easily as through a straight tube. There are no baffles to set up restriction. Noise is silenced by

the patented, acoustical construction of this muffler.

The Burgess "straight-thru" construction eliminates all waste of power in the muffler. Increases of top speed of several miles per hour have been obtained by many leading car manufacturers with the Burgess Muffler.



AS illustrated above, the Burgess Muffler consists of three principal parts: a straight open perforated pipe, D, surrounded by a sound-absorbing material, E, which is enclosed in a metal covering, F. The exhaust gases from the engine pass straight through the perforated pipe, D, but the exhaust noises are absorbed, assuring satisfactory muffling.

BURGESS
BATTERY COMPANY

ACOUSTIC DIVISION, MADISON, WISCONSIN
DETROIT ADDRESS: 542 NEW CENTER BUILDING

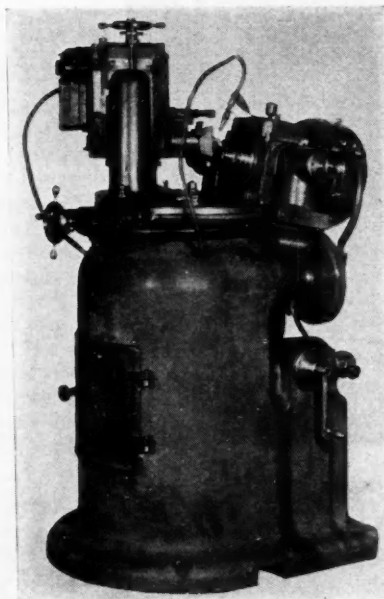
ENGINEERS AND MANUFACTURERS OF ELECTRIC AND ACOUSTIC PRODUCTS

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

National-Cleveland Radial Helicoid Grinder

An automatic radial helicoid grinder for producing staggered-tooth helical gear-shaped cutters has been placed on the market by the National Tool Co., Cleveland, Ohio. It is fully automatic except for loading and unloading and is said to produce precision work at low cost. The machine will generate a radial helicoid cutting face either normal to the axis or at an angle, and will produce a hook or an undercut as desired.



Two motors are required: one, $\frac{1}{2}$ hp., 3450 r.p.m. for grinding wheel spindle; and one $\frac{3}{4}$ -hp., 1750-r.p.m. motor for driving the machine. Standard electrical equipment for 220 or 440 volt A.C., 3 phase, 60 cycle. Net weight about 3000 lb. Floor space 32 x 38 in.

It is claimed that a 4-in. P. D. cutter can be resharpened in about five minutes.

Complete details of the machine and the theoretical principles involved in the generation of the radial helicoid will be found in a booklet just published by the manufacturer. It also contains information concerning the operation of the machine, its set-up, and inspection of finished cutters.

New Swivel Caster

The TonWate caster now being produced by Divine Brothers Co., Utica, N. Y., is of simplified 2-piece design, constructed throughout of heat-treated steel forgings, chrome nickel steel balls and Hyatt roller bearings.

In the TonWate the rigid king pin is replaced by a flexible ball joint, seated on the hardened cup of a Dardet self-locking safety set screw. The raceways are held together by the simple method of splitting them vertically, instead of horizontally.

By this balanced assembly, the load is said to be distributed on center and annular balls, approximately two-thirds on the former and one-third on the latter. Each ball supports equal

load and resists an equal share of the thrust.

The main load bearing and swivel bearings operate in a continuous reservoir of lubricant, sealed against dirt and water. The axle also is protected



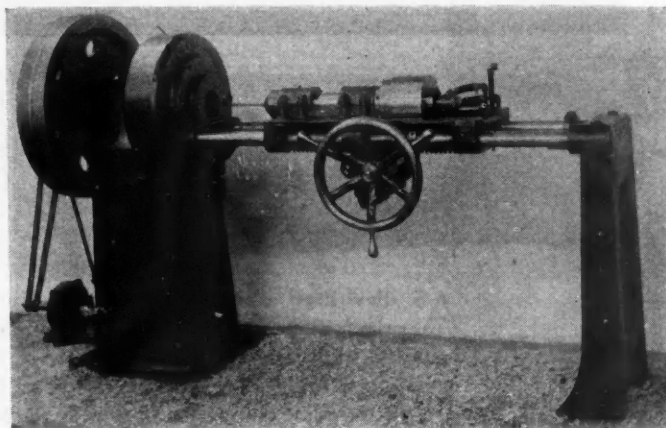
by positive lubrication. Hub guards prevent the entrance of dirt, grit and water; also prevent strings and raveling from winding around axle and binding the wheel.

TonWate is supplied in a wide range of sizes, with steel and canvas cushion wheels. Also supplied in a rigid-type caster.

Langelier Swaging Machine For Reducing Valve Blanks

A water-jacketed head-swaging machine, constructed with four dies, for reducing valve blanks before upsetting to eliminate turning and its attendant waste of material, has been developed by the Langelier Mfg. Co., Providence, R. I.

tendency of twisting hot stock during swaging is offset, as the chuck is allowed to rotate in split bearings, the proper amount of friction being applied to control the speed of rotation. Interchangeable collets are used so that any size of blank up to the capacity of the machine can be swaged. The tooling furnished with the equipment will handle the reducing of 21/32



The machine is equipped with a handwheel-operated rack and pinion-feeding mechanism, having an automatic air chuck that grips the work on the forward movement of the saddle and releases it automatically at the end of the feed stroke. To insure sufficient power and easy feeding, compound gears are interposed between the handwheel and pinion shafts. The

in. diameter valve steel blanks to 25/64 in. diameter in one operation, although a wide range of sizes can be accommodated by changing the dies and grip collet. Any length up to 20 in. can be swaged as the feeding mechanism is designed for this feed.

The floor space required by the equipment is 30 x 90 in., the overall height is 50 in. and the weight 1800 lb.

New FIRESTONE TYPE "R" RIM ONLY TWO PIECES *Both Continuous*

A BRAND new Firestone development—a rim with only two continuous pieces—no split members. Simple in design. Easy to operate.

Localized deflection, common to rims with a split member is eliminated in the new Firestone 5" and 6" Type R Rim. Rigid support for the entire circumference of the tire bead *minimizes bead failures and makes possible increased tire mileage.*

This new Firestone Rim is designed especially for the present day high speeds of light and medium duty trucks. It is available for either cast or disc wheels—Firestone Standardized 28° Bevel provides complete interchangeability on present equipment.

Specify Firestone Type R Rims on new equipment and changeovers.

A rim embodying this same principle has been developed for passenger cars, and is known as the Firestone Type "RP" Rim.

**THE FIRESTONE STEEL
PRODUCTS CO.**

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Firestone

Continuous Base RIMS

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Automotive Industries

August 13, 1932

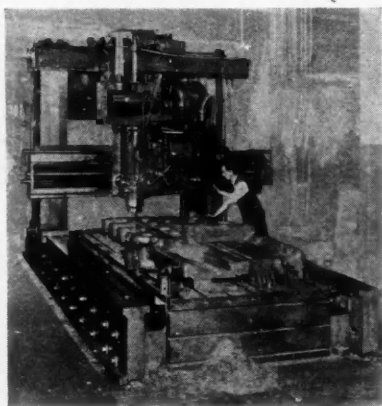
NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Universal Milling Machine

A vertical spindle Universal milling machine which is said to be a distinct departure from the usual types and which operates on an entirely new principle has been placed on the market by Sleeper & Hartley, Inc., Worcester, Mass. Milling operations can be performed on five faces without changing the position of the piece and holes in the vertical plane can be bored, drilled or tapped under power with the assurance that each operation is exactly at right angles to the adjacent plane.

In appearance this machine resembles a planer-type miller but the table is stationary and the housing with its rail and spindle head travels over the work on ways. This is said to produce a saving of about 30 per cent in floor space.



All electrical controls are of the push-button or controller-box types, located so as to be most convenient, while the gear shifts are controlled from either side of the machine. In addition, cross-feed controls are located at the head.

The spindle is driven by a four-speed 10 hp. motor mounted on the same frame as the spindle and moving with it, the connection being by a direct worm gear. By means of a back-gear arrangement, lever controlled, eight spindle speeds may be obtained. A separate 7 hp. motor mounted on the top cross-tie provides the power for all feeds and motion of the head, speeds of travel being obtained through a gear shift.

Specifications on the new machine are: Distance between the housings,

6 ft. 2 in.; maximum height of cutter, 50 in.; vertical travel of spindle, 15 in.; capacity of machine, 14 ft. by 8 ft.; floor space 20 ft. by 13 ft.; table area 12 ft. by 5 ft. 2 in.; weight 45,000 lb.

Spindle speeds range from 16 to 49 r.p.m. on the back gear; 102 to 307 r.p.m. on the direct gear. Spindle feeds are from .001 in. to .270 in. per revolution of the spindle. The housings feed on direct gear are from .002 in. to .406 in. on direct gear and from .0015 in. to .305 in. per spindle revolution on reverse gear.

The two smaller machines in this type miller have capacities of 4 ft. by 4 ft. and 6 ft. by 8 ft.

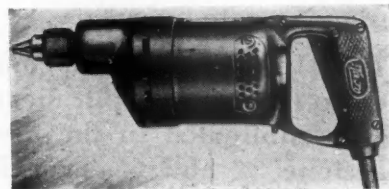
Thor Universal Electric Drills

The Independent Pneumatic Tool Co., Chicago, is now manufacturing two new electric drills—a ¼-in. size, with grip switch, known as USA, and a ½-

in. size, with side switch, designated as URA.

Precision ball bearings of the closed-back type are used throughout. This type of bearing prevents grease from entering into the motor and at the same time is subject to lubrication from the gear case because the open end of the bearing faces the gear case.

The switch is of the double-pole type and breaks both sides of the line at the same time, thereby disconnecting the current from the line to the motor. It is simple in construction, convenient for connecting the wires



and fully protected from dust and dirt. The switch on the USA is operated by a long lever and is so arranged that it can be changed to either safety first or positive switch by merely pressing the lock button on the side of the handle.

The USA illustrated has a capacity of ¼ in. Speed is 2500 r.p.m. Weight is 8 lb.

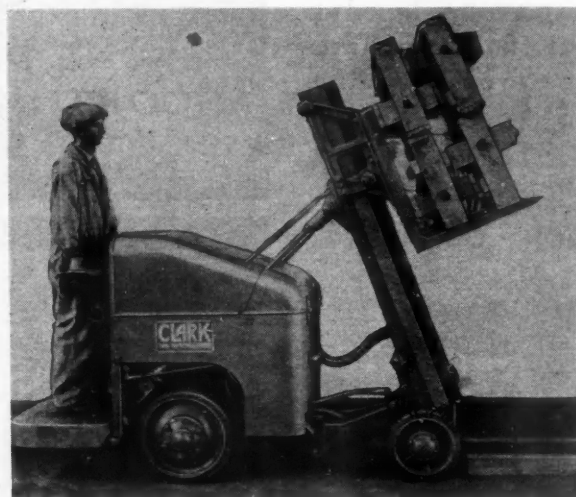
The URA has a capacity of ½ in. Speed is 500 r.p.m. Weight is 14¼ lb. Equipped with comfortable side switch, side handle and combination spade handle and breast plate.

Clark Has Versatile Truck

A lifting, tilting, tiering truck of unusual versatility is offered by the Clark Tractor Co., Battle Creek, Mich., to those industries in which the economical handling of heavy bales, cases,

one to six miles an hour and tilts it forward 7 deg. to tier it safely at a height up to 50 in.

The lifting and tilting mechanism is actuated by hydraulic pressure supplied by an oil pump. Motive power consists of a tractor type engine, gas



bundles and crates is a problem. This truck inserts its long steel fingers under any load that has as much as 2 in. under-clearance, tilts it back a maximum of 20 deg., lifts it, carries it at

powered for 24 hours' continuous operation. Rear wheel drive and four wheel steer insure maximum flexibility. It is available in two sizes, 2-ton and 3-ton.

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Volume 67

Reg. U. S. Pat. Off.

Number 8

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Automotive Industries



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various units have been developed to combine perfect line and performance.

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